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<110> Abe, Yuki
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30720

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31800

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31860

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31980

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30840

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30900

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31620

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31680

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31740

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32820

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32880

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33000

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33060

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33240

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33540

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33600

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33660

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33780

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33840

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33960

gcatatacga attcaaactc gtttttcaac gccacgcgca gtttagagat ctggacgcgg
34020

aatatggctg ctgagcaccg ggcaccgtgg atgcataaga gagcttttct cggtttgcct
34080

ggcgagaaat ctgtaatcct cgctggactc attttctctt gtgggtgtgag ctgtgacttc
34140

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34200

atc
34203

<210> 3

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: A mixed primer
which has a DNA sequence deduced from the amino
acid sequence of PKS of *Aspergillus flavus*.

<220>

<221> modified_base

<222> (6)..(6)

<223> i

<220>

<221> modified_base

<222> (9)..(9)

<223> i

<400> 3

gayacngcnt gyasttc
17

<210> 4

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: A mixed primer
which has a DNA sequence deduced from the amino
acid sequence of PKS of Aspergillus flavus.

<220>

<221> modified_base

<222> (3)..(3)

<223> i

<220>

<221> modified_base

<222> (6)..(6)

<223> i

<220>

<221> modified_base

<222> (8)..(8)

<223> i

<220>

<221> modified_base

<222> (15)..(15)

<223> i

<400> 4

tcnccnknrc wgtgncc
17

<210> 5

<211> 19

<212> DNA

<213> Penicillium citrinum

<400> 5

gcatgttcaa tttgctctc
19

<210> 6

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 6

ctggatcaga cttttctgc
19

<210> 7

<211> 18

<212> DNA

<213> *Penicillium citrinum*

<400> 7

gtcgcagtag catgggcc
18

<210> 8

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 8

gtcagagtga tgctcttctc
20

<210> 9

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 9
gttgagagga ttgtgagggc
20

<210> 10

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 10
ttgcttggtg tggattgtc
19

<210> 11

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 11
catggtactc tcgcccgttc
20

<210> 12

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 12
ctccccagta cgtaagctc
19

<210> 13
<211> 21
<212> DNA
<213> *Penicillium citrinum*

<400> 13
ccataatgag tgtgactggt c
21

<210> 14
<211> 19
<212> DNA
<213> *Penicillium citrinum*

<400> 14
gaacatctgc atccccgtc
19

<210> 15
<211> 20
<212> DNA
<213> *Penicillium citrinum*

<400> 15
ggaaggcaaa gaaagtgtac
20

<210> 16
<211> 21

<212> DNA

<213> *Penicillium citrinum*

<400> 16

agattcattg ctgttgcat c
21

<210> 17

<211> 722

<212> DNA

<213> *Penicillium citrinum*

<400> 17

ggccacgcgt cgactagtac gggggggggg gggggggggg gcttggtcgc tcagagattc
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aactctgcga ttctgtttaa tcccaatcct atcgcccaa aacaggatca gcagttatgg
120

atcaagccaa ctatccaaac gagccaattg tggtagtggg aagcggttgt cggtttccag
180

gtgggtgtcaa cacaccatca aaactttggg agctgctcaa agagccccgg gatgtacaga
240

ccaagatccc taaggagaga tttgacgtcg atacatttta cagccccgat ggcactcacc
300

ccgggcgcac gaacgcaccc tttgcatact tgctgcagga ggatctacgc ggttttgatg
360

cctctttctt caacatccaa gctggagagg ccgaaacgat tgaccacag caaaggctgc
420

tgctggagac ggtctatgaa gctgtatcca acgcaggcct acggatccaa ggccttcaag
480

gatcctctac tgctgtgtac gtcggtatga tgacgcatga ctatgagact atcgtgacgc
540

gtgaattgga tagtattcct acatactctg ccacgggggt agctgtcagt gtggcctcca

600

accgtgtatc atacttcttc gactggcatg ggccgagtat gacgatcgac acagcctgta
660

gttcacctt agctgccgtg catctggccg tccaacagct tagaacgggc gagagtacca
720

tg
722

<210> 18

<211> 760

<212> DNA

<213> *Penicillium citrinum*

<400> 18

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ccaggcgac tgatatatca gtcaatgaaa caacgttgga atgaacaata cccccgccgt
120

aaccgcaacc gcaaccgcaa ccgcaaccgc aaccgcaatg gcaggctcgg cttgctctaa
180

cacatccacg ccattgcca tagttggaat gggatgtcga tttgctggag atgcaacgag
240

tccacagaag ctttgggaaa tggttgaaag aggaggcagt gcctgggtcta aggtcccctc
300

ctcgcgattc aatgtgagag gagtatacca cccgaatggc gaaagggtcg ggtccacca
360

cgtaaagggt ggacacttca tcgacgagga tcctgcttta tttgacgccg cgttcttcaa
420

catgaccaca gaggtcgcca gctgcatgga tccgcagtat cggcttatgc ttgagggtggt
480

ctacgaatcg ctggagagtg ccggtatcac catcgatggg atggcagggt ctaatacgtc
540

ggtgtttggg ggtgtcatgt accacgacta tcaggattcg ctcaatcgtg accccgagac
600
agttccgcgt tatttcataa ctggcaactc aggaacaatg ctttcgaacc ggatatcaca
660
cttctacgac ttacgtggtc ccagcgtgac ggttgacacg gcctgttcga cgacattgac
720
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760

<210> 19

<211> 773

<212> DNA

<213> *Penicillium citrinum*

<400> 19

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120
cagcgtcttc attcttcgct ctttcttctt ttccactggg gtgcataggt cctatctgtc
180
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240
tcaagccctt gtggcggtcg cagtgttct tagtctcatc gcctaccgtt tgcgggggag
300
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360
taggcaggac ttcgatacgt atgggtccgag ctggatcgaa gcttggttct cgaaaaacga
420
caagcccctg cgcttcattg ttgattccgg ctattgcacc atcctcccat cgtccatggc
480
cgacgagttt cggaaaatca aagatatgtg catgtacaag tttttggcgg atgactttca
540

ctctcatctc cctggattcg acgggttcaa ggaaatctgc caggatgcac atcttgtcaa
600

caaagttggt ttgaaccagt tacaaccca agccccaag tacacaaage cattggctac
660

cttggccgac gctactattg ccaagttggt cggtaaaagc gaggagtggc aaaccgcacc
720

tgtctattcc aatggattgg accttgtcac acgaacagtc acactcatta tgg
773

<210> 20

<211> 527

<212> DNA

<213> *Penicillium citrinum*

<400> 20

ggccacgcgt cgactagtag gggggggggg gtacctagga actgttcagt tgtccctccc
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aacccttgg gccgaacaac ctccctccaa tctacgacgg cagattatac ctaggcgcct
120

aaccgattag gttgctcatt cgattttgga gagactacct agctataggt accactccaa
180

gctgtagcac agacctttca gcatggtcgc ttcgttgcta cctctcgcct ttcgcggtag
240

ggaatcaatg aatcagcagc accctctacg ctcgggaaat cgggcattga cctccacact
300

ccaatttcta tccaaaacgg cgtgtctaca cccgatccat accgtttgca ccatagctat
360

tctagctagt accacatacg ttggactact caaagacagc ttcttccatg gccccgcaaa
420

cgttgataaa gcagaatggg gctctttggt cgaaggaagt cgaagcttga tcaccggccc
480

acagaatggc tggaagtggc agagcttcga cggggatgca gatgttc
527

<210> 21

<211> 522

<212> DNA

<213> *Penicillium citrinum*

<400> 21

ggccacgcgt cgactagtac gggggggggg gggggggggg ggatccatca atctgacttc
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aggctagcgg accttaacga aacaacgaga gcgagatcat tcatacacca aaacacaggt
120

actatagaag cgccgcgcag tagagattca caccgcccct tgaagcaaaa gtcggaagga
180

attgcgcgat gtcagaacct ctacccccta aagaagggga accaaggcca cagaaggaag
240

aaagtcaaaa tgacacgctc gaagcgactg agtccaagtc ccagcacatc acaggcctca
300

agctcgggct ggtgggttgct tcagttactt tcgtagcatt tttgatgctc cttgatatgt
360

ccattatcgt cacggcaatc ccacatatca caagcgagtt ccaactctctg aacgatgtag
420

ggtggtaacg cagtgccttat cttctggcta actgtgctct ccagcccctg gccggtaa
480

tgtatacact cttgggcttg aagtacactt tctttgcctt cc
522

<210> 22

<211> 541

<212> DNA

<213> *Penicillium citrinum*

<400> 22

ggccacgcgt cgactagtac gggggggggg ggctcacctc acattatttg atcttaatcc
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aataattatg tccctgccgc atgcaacgat tccgacgaac ctacgccgtc gcgcgtttcg
120

acgtcatgt gaccgggtgc atgcacaaaa gctcaaattgt accggtagca atgccaattt
180

agtccgtgct cagtgtcaac gttgtcagca agccggatta aggtgtgtgt acagcgaaag
240

gctaccaag cgcaatttac ataaagaagc cgcagctgga actacaagag ccacagaaac
300

ctcacaaccg atgaccgcga catcttctac ggtcttctca tcattggcag agactcctcc
360

accttactgc tcaccaccta cgcattattgg cacctcggca ctcaaggaaa cattatcaga
420

accatcagcg gcaaccctgc aattctatga tacatcaatc aactttgatg atcccagatc
480

gtttcccggc ggctggcctc agccaaatac atttcgcgac gatgccaaaca gcaatgaatc
540

t
541

<210> 23

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 23

atcataccat cttcaacaac
20

<210> 24

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 24

gctagaatag gttacaagcc
20

<210> 25

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 25

acattgccag gcacccagac
20

<210> 26

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 26

caacgcccac gctgccaatc
20

<210> 27

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 27
gtcttttcct actatctacc
20

<210> 28

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 28
ctttcccagc tgctactatc
20

<210> 29

<211> 1524

<212> DNA

<213> *Penicillium citrinum*

<400> 29
aactggaaga attcgcggcc gcaggaattt tttttttttt tttttttcaa cgaaggtaga
60

agtaattttg acaaagatac aagacgaatt cgctatttgt agatgaatat gcgtgtgtca
120

attgaagccg aattcaggat agatttgcca tctgctctat tgccaatttc taatccatct
180

ttatcatgaa caacactcaa accacacatc tgaattcacg gcgctgaacg atctaggcca
240

attcagagc cgggttcacg gagaacatag tgaggattga agaaaagtgg tctacaaagg
300

cctgagcgtg ctcagggcca tacagcgagc tctgaagttt gacatgaatg agtgggtcct
360

tggtagggtc atcccacatc tcgagaacga tgtcataagg agtgcgctca cgggaagcga

420

gaacactcgt cattttggca ttgccaattg agccactctc cgcttgaccc tgcttgtaat
480

caaagacagc ctggaacaag ggggcgtgtg tctgagtctt gggttcctcg cctgaggtag
540

ggagattcag gcctagacag tcgaggatga cgccatacgg caccgcgcgc tgttgcatgg
600

cctcagcac actgtccttg gtggctacaa ggtgctcgcc gaatgtcttg ctgccgacga
660

actcatcaaa gcgcagggga agcacgttag cgaaaaagcc catcgccgaa atttcttcca
720

tggtggatcg gttggtttcg gcgaggccga tggttatgtc tttgctgccg gtaagacgcg
780

ccaacaaaac gtggtaggcg gccaggtaga actgcatggg ggttgccttg tgcttgccgc
840

tccgctcttt gattcggaag gcgaccatgg gatctaaacg agcaattgct tcatactgct
900

gccacgtgaa tggctgtatt tgctgctgct ctgaattggc agcaggggtca ttgatcagat
960

tcatgatggg aagcacgggt ggccgagatg acgagacttt gctatgcatg gacttccaga
1020

acgcgatatc gtccccatt cgccattttt ccagggtttc ccgctggttg acggctagat
1080

cagagaattg ggtcgatggc cgctgcattt tcaccccgct gtaaactctgc ccgatctcat
1140

tgaacagggt ttctgttggt gagccatcac caactaatct gtggtagccg attaccaaca
1200

ggtggtcatc tgtgccccag tagaaatcaa cgagtctgag agtgtcacct gtggagatgc
1260

tatagtttgt cttctcgagt ttccggtact cttcctctgc ctccgcagcg ttgttcacct
1320

gaacaaagtg cactctgttc tccgggttct tgagaaccac ttggacggga ccatttaaatt
1380

cgctgctata gtcacgcgcca gtaacaaagc acgtacggaa gatctcgtga cggcgcaatg
1440

aggctttcag agcccgctc aaccggtcga ggtcaatggt acccttcatg aacatgccaa
1500

tagtgttggt gaagatggta tgat
1524

<210> 30

<211> 784

<212> DNA

<213> *Penicillium citrinum*

<400> 30

aactggaaga attcgcggcc gcaggaattt tttttttttt tttttttttc tttgttgctt
60

ctcagggcca ctgtaatggt atttcaggta tctctattta ctgctatcca gaagtcaggc
120

attaaatagt caggctcagc ccaggctcga ttcagattgg attcaggctt cagaccatgg
180

ccgctatgct ccttcgtact atacctccgt cgagctatac ccgcttggcc agacaaaagg
240

cttcactgaa cccttcaact taactgcatt tcgccacaac taactcgacg aggccggcga
300

tggtgttacc attcatgagc tcaaagatcg acacatcaac atggatttca gatgtgatcc
360

agtttcgaag ttcaatggcg acgagtgagt ctacgccgac acctgccagg tttttggacg
420

aggacatgtc gtcttctgcc agaccaaaca ttcgcatcag cttttccgtc attgctttga
480

ggacgataga aatggcctcg tcgtgagagg tgaccctgct tagttgggccc cgcacgccat
540

ctggtccttt tttatgcgaa gagacaaagg attgggtctgc atgaaggact tggcggtatt
600

taagtccac aaaccgctgt tctgtatcc agtttgctc ggtccagtga gcacccggg
660

atgtgttgat tctgttaacc acagctgcgg gaggtgatgg aaattgaggg gaagaacaca
720

ggattgcctt ctccaacaca tccatgacgt ccttttcatg cataggcttg taacctattc
780

tagc
784

<210> 31

<211> 764

<212> DNA

<213> *Penicillium citrinum*

<400> 31

aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttttgc gaataaaatg
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cgttttatct tactaaccta ctgcactaat acagcaccta gtttctctgg gacggaaacc
120

attggaataa gcctggggac ggatgcatat ttgttttagt ttgcgtgtta tatcttagca
180

ccggtcatga gggagcggga tgcctcgtt gcgccggcgt accatgagct ttgtggttgg
240

atgcatacga acgctaaaag cgtgacggta gtatttgtca tcgtctcctg gtacaggctt
300

cacatcatat tgaatcagta tatgagcgag gagaatcttg atttccttcg aggcgaagaa
360

ccgcccggga caagcgcgtg ggttccagcc gaagccgatg tgatcacctg tggattctc
420

caattgagcg gtgaaggcct tgtctggatc ctgcgcgatg cgcataaatc ggtagggatc
480

ataattttcg gggttttccc acacatcagg gttgttcatg cggctctgcag ccacagcggc
540

caactcgccc ttgggaatga agaggccatt ggatagagtg atgtctctga gacgggtact
600

gcgcatagtg gcgcactcga ccggcttgat tcgctgcgtc tctttcatgc agctgtcgag
660

gagcttcagc ttgaacagag aggcaggcgt ccagccccct tctccgatta cagtgcggat
720

ctcttggcgg agaggctgaa taaggctctgg gtgcctggca atgt
764

<210> 32

<211> 765

<212> DNA

<213> *Penicillium citrinum*

<400> 32

aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttctgg aaaaggacca
60

tctctttata tattcttctt ccctactact tgcacgtaa atttcaacaa catataaaca
120

tgagataccc tttctggccg ttcactctac cacctgcctg tctcattgca ttgtgctttt
180

gaaaattatg acaataacaa ccaatgagaa aaaatatgat cctcctgcaa tgaatccact
240

ggagggggta cggagcttgg aatgctccta agattccgac ctaatcagcg tcgagccga
300

tcagtagctg cagcactcgg cctcagtgca ttgttaggaa cagggactgt cctgggtccg
360

cctgacgggg agacacttcg agaaggggct gaagatgccg gggcagaacg gttgtgcgcc
420

atgtgcgcct tgaccaggtg accggcggct agggcagcac atagcgagag ctccccagcc
480

aaaacagcgc ttccgatgat gcgcgcaagt tgacgtgcat tctcaecggg agtggtcggg
540

tgtgatccgc ggacaccaag catgtcaagc attgogccct ggggctccag aatcgtacca
600

ccgcccacg ttccaacctc aatagacggc atggagacag agatttgaag cgatccgcga
660

agattgttca tgagagtgat gcagttagcg ctctccacaa cttgcgccgg atcctgacct
720

gtggcaatga aaatggctgc cgcaagattg gcagcttggg cgttg
765

<210> 33

<211> 802

<212> DNA

<213> *Penicillium citrinum*

<400> 33

aactggaaga attcgcggcc gcaggaattt tttttttttt tttttataga atctttgaaa
60

tcgacattaa ttaagtatgt ggagattctt tgtggaggca cggtaatgtg tctatctagc
120

aacgcggtca agcatcagtc tcaggcacag cccgggtgtc gtttttggtt gcaatcttcc
180

gccatcccat tccaaaggca aacacaaacg tgcacgccgt agctcccact gctaagtaaa
240

aagtatgatc aacggcgaga ctgtaagctt ttacaacccc tggaagggtta ttcttgctga
300

ccacatctct gaagccagtc gccctgctg ccgtcacggc ctgcgtgtcg acagtgggcg
360

catacttgct caggccagtt ctcaaaccgg acccaaagac aaggtttagca aagtccagga
420

agagcgatcc tccaaacgtc tgtccaaaca cggcgagaga aattccgagg gcaccttggt
480

cgggcgaaag cgtgcttttg atggcgatga taggcgtttg catgccacaa ccacgaccga
540

agcccgcgat aaattggtac atgacccatt tcacagttga tgtatggggc tggaaggtgg
600

ataccagacc tgcgcctatg gcgacgagaa cagcgctgcc tagggcccaa ggcaaatagt
660

atcctgtctt tccaattgcg aagccagaaa ccatagccat aatgacttgt ccaagaattc
720

caggcaacat gtacacacca ctcaagtgtg gagaaacatc cttcacagcc tggaagtaga
780

tcggtagata gtaggaaaag ac
802

<210> 34

<211> 562

<212> DNA

<213> *Penicillium citrinum*

<400> 34

aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttttac taagcaatat
60

tgtgtttctt cgctaattgcg aatatttcct tatagcaacg tcgcaacaca tttatcgtct
120

tccttgaggc ctttgttgac ttgggctctt cgtctccggc ttcgtcactc caaagcacag
180

ataggagacg agaggccggc gttatggttt tattttcagc gccaaaggatt tgccacgatg
240

tgcttgcat atctgatagg actagacgaa tagatgccgc agccccgtgc tcctgtgcta
300

tcccaaagc agtctcaatc ccaactcaata gtcgaaggct tacacgcaat gtcgtgcatg
360

cagaagataa ggcgtgcatg aatgggtcga gatgtgaaat gagctcgccg atatgaagat
420

tagagtgaat cgagggaagt gcttcggctc ttccattgtc atttctagtg gttgagccag
480

accagtagca atccattcgt gtgctttgct tttgtccaca aggttgggct ttcattcacct
540

cggatagtag cagctgggaa ag
562

<210> 35

<211> 26

<212> DNA

<213> *Penicillium citrinum*

<400> 35
gttaacatgt cagaacctct accccc
26

<210> 36

<211> 27

<212> DNA

<213> *Penicillium citrinum*

<400> 36
aatatttcaa gcatcagtct caggcac
27

<210> 37

<211> 1662

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(1662)

<400> 37

atg tca gaa cct cta ccc cct aaa gaa ggg gaa cca agg cca cag aag

48
Met Ser Glu Pro Leu Pro Pro Lys Glu Gly Glu Pro Arg Pro Gln Lys

1 5 10 15

gaa gaa agt caa aat gac acg ctc gaa gcg act gag tcc aag tcc cag

96
Glu Glu Ser Gln Asn Asp Thr Leu Glu Ala Thr Glu Ser Lys Ser Gln

20 25 30

cac atc aca ggc ctc aag ctc ggg ctg gtg gtt gct tca gtt act ttc

144
His Ile Thr Gly Leu Lys Leu Gly Leu Val Val Ala Ser Val Thr Phe

35 40 45

gta gca ttt ttg atg ctc ctt gat atg tcc att atc gtc acg gca atc

192
Val Ala Phe Leu Met Leu Leu Asp Met Ser Ile Ile Val Thr Ala Ile

50 55 60

cca cat atc aca agc gag ttc cac tct ctg aac gat gta ggg tgg tac

240
Pro His Ile Thr Ser Glu Phe His Ser Leu Asn Asp Val Gly Trp Tyr

65 70 75 80

ggc agt gct tat ctt ctg gct aac tgt gct ctc cag ccc ctg gcc ggt

288
Gly Ser Ala Tyr Leu Leu Ala Asn Cys Ala Leu Gln Pro Leu Ala Gly

85 90 95

aaa ttg tat aca ctc ttg ggc ttg aag tac act ttc ttt gcc ttc ctc

336
Lys Leu Tyr Thr Leu Leu Gly Leu Lys Tyr Thr Phe Phe Ala Phe Leu

100	105	110
tgt att ttt gaa cta ggc tcg gtg cta tgc ggt gcc gca aga tct tcc		
384		
Cys Ile Phe Glu Leu Gly Ser Val Leu Cys Gly Ala Ala Arg Ser Ser		
115	120	125
acc atg ttg att gtt ggg cgg gcc gtt gct gga atg gga ggc tca ggt		
432		
Thr Met Leu Ile Val Gly Arg Ala Val Ala Gly Met Gly Gly Ser Gly		
130	135	140
ctt gtc aac gga gcc ctc aca atc ctc tca aca gct gct cct aag cac		
480		
Leu Val Asn Gly Ala Leu Thr Ile Leu Ser Thr Ala Ala Pro Lys His		
145	150	155
aag caa cca gtt ttg att gga gtg atg atg ggt ctt agt cag att gcc		
528		
Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala		
165	170	175
att gtc tgt gga cca ctg ctc gga ggt gct ttc act caa cac gcc act		
576		
Ile Val Cys Gly Pro Leu Leu Gly Gly Ala Phe Thr Gln His Ala Thr		
180	185	190
tgg cga tgg tgc ttt tat atc aat ctc ccc atc ggc gct gtc gct gca		
624		
Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala		
195	200	205
ttc ctc ctt ctc gtc atc acc ata ccc gac cga att tca tcc acg gac		
672		
Phe Leu Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp		

210	215	220	
agc gaa ctc tcg acc gac aaa cca atg gcc aac ata aaa tcc aca ctt			
720			
Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu			
225	230	235	240
cgc aaa ctg gac ctt gta ggc ttt gtg gtc ttt gca gcc ttc gca acc			
768			
Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr			
245	250	255	
atg att tcc ctc gca cta gaa tgg gga ggg tcg acc tac acc tgg cga			
816			
Met Ile Ser Leu Ala Leu Glu Trp Gly Gly Ser Thr Tyr Thr Trp Arg			
260	265	270	
agt tcc gtc atc atc ggc ctg ttc tgt ggc gga ggg ttt gct ctg att			
864			
Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Gly Phe Ala Leu Ile			
275	280	285	
gcg ttc gtg cta tgg gag cgt cat gtt ggc gat gct gtt gcc atg att			
912			
Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile			
290	295	300	
cct ggc tca gtg gct ggt aaa cga caa gtg tgg tgc tct tgt tta ttt			
960			
Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe			
305	310	315	320
atg ggc ttt ttc tct ggc tcc ttg ctt gtc ttt tcc tac tat cta ccg			
1008			
Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro			
325	330	335	

atc tac ttc cag gct gtg aag gat gtt tct ccc aca ctg agt ggt gtg
1056

Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val

340

345

350

tac atg ttg cct gga att ctt gga caa gtc att atg gct atg gtt tct
1104

Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser

355

360

365

ggc ttc gca att gga aag aca gga tac tat ttg cct tgg gcc cta ggc
1152

Gly Phe Ala Ile Gly Lys Thr Gly Tyr Tyr Leu Pro Trp Ala Leu Gly

370

375

380

agc gct gtt ctc gtc gcc ata ggc gca ggt ctg gta tcc acc ttc cag
1200

Ser Ala Val Leu Val Ala Ile Gly Ala Gly Leu Val Ser Thr Phe Gln

385

390

395

400

ccc cat aca tca act gtg aaa tgg gtc atg tac caa ttt atc gcg ggc
1248

Pro His Thr Ser Thr Val Lys Trp Val Met Tyr Gln Phe Ile Ala Gly

405

410

415

ttc ggt cgt ggt tgt ggc atg caa acg cct atc atc gcc atc caa agc
1296

Phe Gly Arg Gly Cys Gly Met Gln Thr Pro Ile Ile Ala Ile Gln Ser

420

425

430

acg ctt tcg ccc gaa caa ggt gcc ctc gga att tct ctc gcc gtg ttt
1344

Thr Leu Ser Pro Glu Gln Gly Ala Leu Gly Ile Ser Leu Ala Val Phe

435

440

445

gga cag acg ttt gga gga tcg ctc ttc ctg gac ttt gct aac ctt gtc
1392
Gly Gln Thr Phe Gly Gly Ser Leu Phe Leu Asp Phe Ala Asn Leu Val

450

455

460

ttt ggg tcc ggt ttg aga act ggc ctg agc aag tat gcg ccc act gtc
1440
Phe Gly Ser Gly Leu Arg Thr Gly Leu Ser Lys Tyr Ala Pro Thr Val

465

470

475

480

gac acg cag gcc gtg acg gca gca ggg gcg act ggc ttc aga gat gtg
1488
Asp Thr Gln Ala Val Thr Ala Ala Gly Ala Thr Gly Phe Arg Asp Val

485

490

495

gtc agc aag aat aac ctt cca ggg gtt gta aaa gct tac agt ctc gcc
1536
Val Ser Lys Asn Asn Leu Pro Gly Val Val Lys Ala Tyr Ser Leu Ala

500

505

510

gtt gat cat act ttt tac tta gca gtg gga gct acg gcg tgc acg ttt
1584
Val Asp His Thr Phe Tyr Leu Ala Val Gly Ala Thr Ala Cys Thr Phe

515

520

525

gtg ttt gcc ttt gga atg gga tgg cgg aag att gca acc aaa aac gac
1632
Val Phe Ala Phe Gly Met Gly Trp Arg Lys Ile Ala Thr Lys Asn Asp

530

535

540

acc cgg gct gtg cct gag act gat gct tga
1662
Thr Arg Ala Val Pro Glu Thr Asp Ala

545

550

<210> 38

<211> 553

<212> PRT

<213> Penicillium citrinum

<400> 38

Met Ser Glu Pro Leu Pro Pro Lys Glu Gly Glu Pro Arg Pro Gln Lys
1 5 10 15

Glu Glu Ser Gln Asn Asp Thr Leu Glu Ala Thr Glu Ser Lys Ser Gln
20 25 30

His Ile Thr Gly Leu Lys Leu Gly Leu Val Val Ala Ser Val Thr Phe
35 40 45

Val Ala Phe Leu Met Leu Leu Asp Met Ser Ile Ile Val Thr Ala Ile
50 55 60

Pro His Ile Thr Ser Glu Phe His Ser Leu Asn Asp Val Gly Trp Tyr
65 70 75 80

Gly Ser Ala Tyr Leu Leu Ala Asn Cys Ala Leu Gln Pro Leu Ala Gly
85 90 95

Lys Leu Tyr Thr Leu Leu Gly Leu Lys Tyr Thr Phe Phe Ala Phe Leu
100 105 110

Cys Ile Phe Glu Leu Gly Ser Val Leu Cys Gly Ala Ala Arg Ser Ser
115 120 125

Thr Met Leu Ile Val Gly Arg Ala Val Ala Gly Met Gly Gly Ser Gly
130 135 140

Leu Val Asn Gly Ala Leu Thr Ile Leu Ser Thr Ala Ala Pro Lys His
145 150 155 160

Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala
 165 170 175

Ile Val Cys Gly Pro Leu Leu Gly Gly Ala Phe Thr Gln His Ala Thr
 180 185 190

Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala
 195 200 205

Phe Leu Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp
 210 215 220

Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu
 225 230 235 240

Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr
 245 250 255

Met Ile Ser Leu Ala Leu Glu Trp Gly Gly Ser Thr Tyr Thr Trp Arg
 260 265 270

Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Gly Phe Ala Leu Ile
 275 280 285

Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile
 290 295 300

Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe
 305 310 315 320

Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro
 325 330 335

Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val
 340 345 350

Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser

355					360					365					
Gly	Phe	Ala	Ile	Gly	Lys	Thr	Gly	Tyr	Tyr	Leu	Pro	Trp	Ala	Leu	Gly
370						375					380				
Ser	Ala	Val	Leu	Val	Ala	Ile	Gly	Ala	Gly	Leu	Val	Ser	Thr	Phe	Gln
385					390					395					400
Pro	His	Thr	Ser	Thr	Val	Lys	Trp	Val	Met	Tyr	Gln	Phe	Ile	Ala	Gly
				405					410					415	
Phe	Gly	Arg	Gly	Cys	Gly	Met	Gln	Thr	Pro	Ile	Ile	Ala	Ile	Gln	Ser
			420					425					430		
Thr	Leu	Ser	Pro	Glu	Gln	Gly	Ala	Leu	Gly	Ile	Ser	Leu	Ala	Val	Phe
		435					440					445			
Gly	Gln	Thr	Phe	Gly	Gly	Ser	Leu	Phe	Leu	Asp	Phe	Ala	Asn	Leu	Val
450						455					460				
Phe	Gly	Ser	Gly	Leu	Arg	Thr	Gly	Leu	Ser	Lys	Tyr	Ala	Pro	Thr	Val
465					470					475					480
Asp	Thr	Gln	Ala	Val	Thr	Ala	Ala	Gly	Ala	Thr	Gly	Phe	Arg	Asp	Val
				485					490					495	
Val	Ser	Lys	Asn	Asn	Leu	Pro	Gly	Val	Val	Lys	Ala	Tyr	Ser	Leu	Ala
			500					505					510		
Val	Asp	His	Thr	Phe	Tyr	Leu	Ala	Val	Gly	Ala	Thr	Ala	Cys	Thr	Phe
		515					520					525			
Val	Phe	Ala	Phe	Gly	Met	Gly	Trp	Arg	Lys	Ile	Ala	Thr	Lys	Asn	Asp
	530					535					540				
Thr	Arg	Ala	Val	Pro	Glu	Thr	Asp	Ala							
545					550										

<210> 39

<211> 31

<212> DNA

<213> *Penicillium citrinum*

<400> 39

ggatccatgt ccctgccgca tgcaacgatt c
31

<210> 40

<211> 30

<212> DNA

<213> *Penicillium citrinum*

<400> 40

ggatccctaa gcaatattgt gtttcttcgc
30

<210> 41

<211> 1380

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(1380)

<400> 41

atg tcc ctg ccg cat gca acg att ccg acg aac cta cgc cgt cgc gcg

48
 Met Ser Leu Pro His Ala Thr Ile Pro Thr Asn Leu Arg Arg Arg Ala
 1 5 10 15
 ttt cga cgc tca tgt gac cgg tgt cat gca caa aag ctc aaa tgt acc
 96
 Phe Arg Arg Ser Cys Asp Arg Cys His Ala Gln Lys Leu Lys Cys Thr
 20 25 30
 ggt agc aat gcc aat tta gtc cgt gct cag tgt caa cgt tgt caa caa
 144
 Gly Ser Asn Ala Asn Leu Val Arg Ala Gln Cys Gln Arg Cys Gln Gln
 35 40 45
 gcc gga tta agg tgt gtg tac agc gaa agg cta ccc aag cgc aat tta
 192
 Ala Gly Leu Arg Cys Val Tyr Ser Glu Arg Leu Pro Lys Arg Asn Leu
 50 55 60
 cat aaa gaa gcc gca gct gga act aca aga gcc aca gaa acc tca caa
 240
 His Lys Glu Ala Ala Ala Gly Thr Thr Arg Ala Thr Glu Thr Ser Gln
 65 70 75 80
 ccg atg acc gcg aca tct tct acg gtc ttc tca tca ttg gca gag act
 288
 Pro Met Thr Ala Thr Ser Ser Thr Val Phe Ser Ser Leu Ala Glu Thr
 85 90 95
 cct cca cct tac tgc tca cca cct acg cat att ggc acc tcg gca ctc
 336
 Pro Pro Pro Tyr Cys Ser Pro Pro Thr His Ile Gly Thr Ser Ala Leu
 100 105 110
 aag gaa aca tta tca gaa cca tca gcg gca acc ctg caa ttc tat gat
 384

Lys Glu Thr Leu Ser Glu Pro Ser Ala Ala Thr Leu Gln Phe Tyr Asp

115

120

125

aca tca atc aac ttt gat gat ccc gag tcg ttt ccc ggc ggc tgg cct
432

Thr Ser Ile Asn Phe Asp Asp Pro Glu Ser Phe Pro Gly Gly Trp Pro

130

135

140

cag cca aat aca ttt cgc gac gat gcc aac agc aat gaa tct tcg ggg
480

Gln Pro Asn Thr Phe Arg Asp Asp Ala Asn Ser Asn Glu Ser Ser Gly

145

150

155

160

ata cca gat cta ggc tac gac ttt gaa ggc cct ttg gat gca acg gcg
528

Ile Pro Asp Leu Gly Tyr Asp Phe Glu Gly Pro Leu Asp Ala Thr Ala

165

170

175

cct gtc tcg cca tcg ctg ttt gac ctc gaa gta gag ggg aac tcg tca
576

Pro Val Ser Pro Ser Leu Phe Asp Leu Glu Val Glu Gly Asn Ser Ser

180

185

190

tcc gga caa tcc aac aca agc aac acg caa cga gac ctt ttc gaa agt
624

Ser Gly Gln Ser Asn Thr Ser Asn Thr Gln Arg Asp Leu Phe Glu Ser

195

200

205

ctg tcg gat gtg tca cag gac cta gag gta ata ctc cac ggg gtg act
672

Leu Ser Asp Val Ser Gln Asp Leu Glu Val Ile Leu His Gly Val Thr

210

215

220

gtg gaa tgg ccc aag caa aaa att tta agc tac ccg ata ggg gac ttt
720

Val Glu Trp Pro Lys Gln Lys Ile Leu Ser Tyr Pro Ile Gly Asp Phe

225	230	235	240
ttg aat gcc ttt ggt aga ttg cta cta cat ctt caa gaa cgt gtg atc 768 Leu Asn Ala Phe Gly Arg Leu Leu Leu His Leu Gln Glu Arg Val Ile			
245	250	255	
acg agc agc aat agc agc atg tta gat ggg tgt ctg caa acc aag aac 816 Thr Ser Ser Asn Ser Ser Met Leu Asp Gly Cys Leu Gln Thr Lys Asn			
260	265	270	
ttg ttc atg gcg gtg cat tgc tac atg ttg tct gtc aaa atc atg aca 864 Leu Phe Met Ala Val His Cys Tyr Met Leu Ser Val Lys Ile Met Thr			
275	280	285	
tca ctt tcc cag ctg cta cta tcc gag gtg atg aaa gcc caa cct tgt 912 Ser Leu Ser Gln Leu Leu Leu Ser Glu Val Met Lys Ala Gln Pro Cys			
290	295	300	
gga caa aag caa agc aca cga atg gat tgg tac tgg tct ggc tca acc 960 Gly Gln Lys Gln Ser Thr Arg Met Asp Trp Tyr Trp Ser Gly Ser Thr			
305	310	315	320
act aga aat gac aat gga aga gcc gaa gca ctt ccc tcg ttt cac tct 1008 Thr Arg Asn Asp Asn Gly Arg Ala Glu Ala Leu Pro Ser Phe His Ser			
325	330	335	
aat ctt cat atc ggc gag ctc att tca cat ctc gac cca ttc atg cac 1056 Asn Leu His Ile Gly Glu Leu Ile Ser His Leu Asp Pro Phe Met His			

340	345	350
gcc tta tct tct gca tgc acg aca ttg cgt gta agc ctt cga cta ttg		
1104		
Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu		
355	360	365
agt gag att gag act gct ttg ggg ata gca cag gag cac ggg gct gcg		
1152		
Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala		
370	375	380
gca tct att cgt cta gtc cta tca gat atg cca agc aca tcg tgg caa		
1200		
Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln		
385	390	395
atc ctt ggc gct gaa aat aaa acc ata acg ccg gcc tct cgt ctc cta		
1248		
Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu		
405	410	415
tct gtg ctt tgg agt gac gaa gcc gga gac gaa gag ccc aag tca aca		
1296		
Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr		
420	425	430
aag gcc tca ggg aag acg ata aat gtg ttg cga cgt tgc tat aag gaa		
1344		
Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu		
435	440	445
ata ttc gca tta gcg aag aaa cac aat att gct tag		
1380		
Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala		
450	455	

<210> 42

<211> 459

<212> PRT

<213> Penicillium citrinum

<400> 42

Met Ser Leu Pro His Ala Thr Ile Pro Thr Asn Leu Arg Arg Arg Ala
1 5 10 15

Phe Arg Arg Ser Cys Asp Arg Cys His Ala Gln Lys Leu Lys Cys Thr
20 25 30

Gly Ser Asn Ala Asn Leu Val Arg Ala Gln Cys Gln Arg Cys Gln Gln
35 40 45

Ala Gly Leu Arg Cys Val Tyr Ser Glu Arg Leu Pro Lys Arg Asn Leu
50 55 60

His Lys Glu Ala Ala Ala Gly Thr Thr Arg Ala Thr Glu Thr Ser Gln
65 70 75 80

Pro Met Thr Ala Thr Ser Ser Thr Val Phe Ser Ser Leu Ala Glu Thr
85 90 95

Pro Pro Pro Tyr Cys Ser Pro Pro Thr His Ile Gly Thr Ser Ala Leu
100 105 110

Lys Glu Thr Leu Ser Glu Pro Ser Ala Ala Thr Leu Gln Phe Tyr Asp
115 120 125

Thr Ser Ile Asn Phe Asp Asp Pro Glu Ser Phe Pro Gly Gly Trp Pro
130 135 140

Gln 145	Pro	Asn	Thr	Phe	Arg 150	Asp	Asp	Ala	Asn	Ser 155	Asn	Glu	Ser	Ser	Gly 160
Ile	Pro	Asp	Leu	Gly 165	Tyr	Asp	Phe	Glu	Gly 170	Pro	Leu	Asp	Ala	Thr 175	Ala
Pro	Val	Ser	Pro 180	Ser	Leu	Phe	Asp	Leu 185	Glu	Val	Glu	Gly	Asn 190	Ser	Ser
Ser	Gly	Gln 195	Ser	Asn	Thr	Ser	Asn 200	Thr	Gln	Arg	Asp	Leu 205	Phe	Glu	Ser
Leu 210	Ser	Asp	Val	Ser	Gln	Asp 215	Leu	Glu	Val	Ile	Leu 220	His	Gly	Val	Thr
Val 225	Glu	Trp	Pro	Lys	Gln 230	Lys	Ile	Leu	Ser	Tyr 235	Pro	Ile	Gly	Asp	Phe 240
Leu	Asn	Ala	Phe	Gly 245	Arg	Leu	Leu	Leu	His 250	Leu	Gln	Glu	Arg	Val 255	Ile
Thr	Ser	Ser	Asn 260	Ser	Ser	Met	Leu	Asp 265	Gly	Cys	Leu	Gln	Thr 270	Lys	Asn
Leu	Phe	Met 275	Ala	Val	His	Cys	Tyr 280	Met	Leu	Ser	Val	Lys 285	Ile	Met	Thr
Ser 290	Leu	Ser	Gln	Leu	Leu	Leu 295	Ser	Glu	Val	Met	Lys 300	Ala	Gln	Pro	Cys
Gly 305	Gln	Lys	Gln	Ser	Thr 310	Arg	Met	Asp	Trp	Tyr 315	Trp	Ser	Gly	Ser	Thr 320
Thr	Arg	Asn	Asp	Asn 325	Gly	Arg	Ala	Glu	Ala 330	Leu	Pro	Ser	Phe	His 335	Ser
Asn	Leu	His	Ile 340	Gly	Glu	Leu	Ile	Ser 345	His	Leu	Asp	Pro	Phe 350	Met	His

Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu
355 360 365

Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala
370 375 380

Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln
385 390 395 400

Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu
405 410 415

Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr
420 425 430

Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu
435 440 445

Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala
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<212> DNA

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<220>

<221> CDS

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48

Met Asp Gln Ala Asn Tyr Pro Asn Glu Pro Ile Val Val Val Gly Ser
1 5 10 15

ggt tgt cgg ttt cca ggt ggt gtc aac aca cca tca aaa ctt tgg gag
96
Gly Cys Arg Phe Pro Gly Gly Val Asn Thr Pro Ser Lys Leu Trp Glu
20 25 30

ctg ctc aaa gag ccc cgg gat gta cag acc aag atc cct aag gag aga
144
Leu Leu Lys Glu Pro Arg Asp Val Gln Thr Lys Ile Pro Lys Glu Arg
35 40 45

ttt gac gtc gat aca ttt tac agc ccc gat ggc act cac ccc ggg cgc
192
Phe Asp Val Asp Thr Phe Tyr Ser Pro Asp Gly Thr His Pro Gly Arg
50 55 60

acg aac gca ccc ttt gca tac ttg ctg cag gag gat cta cgc ggt ttt
240
Thr Asn Ala Pro Phe Ala Tyr Leu Leu Gln Glu Asp Leu Arg Gly Phe
65 70 75 80

gat gcc tct ttc ttc aac atc caa gct gga gag gcc gaa acg att gac
288
Asp Ala Ser Phe Phe Asn Ile Gln Ala Gly Glu Ala Glu Thr Ile Asp
85 90 95

cca cag caa agg ctg ctg ctg gag acg gtc tat gaa gct gta tcc aac
336
Pro Gln Gln Arg Leu Leu Leu Glu Thr Val Tyr Glu Ala Val Ser Asn
100 105 110

gca ggc cta cgg atc caa ggc ctt caa gga tcc tct act gct gtg tac
384
Ala Gly Leu Arg Ile Gln Gly Leu Gln Gly Ser Ser Thr Ala Val Tyr

115	120	125	
gct ggt atg atg acg cat gac tat gag act atc gtg acg cgt gaa ttg 432 Val Gly Met Met Thr His Asp Tyr Glu Thr Ile Val Thr Arg Glu Leu			
130	135	140	
gat agt att cct aca tac tct gcc acg ggg gta gct gtc agt gtg gcc 480 Asp Ser Ile Pro Thr Tyr Ser Ala Thr Gly Val Ala Val Ser Val Ala			
145	150	155	160
tcc aac cgt gta tca tac ttc ttc gac tgg cat ggg ccg agt atg acg 528 Ser Asn Arg Val Ser Tyr Phe Phe Asp Trp His Gly Pro Ser Met Thr			
165		170	175
atc gac aca gcc tgt agt tca tcc tta gct gcc gtg cat ctg gcc gtc 576 Ile Asp Thr Ala Cys Ser Ser Ser Leu Ala Ala Val His Leu Ala Val			
180		185	190
caa cag ctt aga acg ggc gag agt acc atg gcg gtt gca gcc ggt gcg 624 Gln Gln Leu Arg Thr Gly Glu Ser Thr Met Ala Val Ala Ala Gly Ala			
195	200	205	
aat ctg ata ttg ggc ccc atg acc ttt gta atg gag agc aaa ttg aac 672 Asn Leu Ile Leu Gly Pro Met Thr Phe Val Met Glu Ser Lys Leu Asn			
210	215	220	
atg ctg tcc ccc aat ggt aga tct cga atg tgg gat gct gct gcc gat 720 Met Leu Ser Pro Asn Gly Arg Ser Arg Met Trp Asp Ala Ala Ala Asp			

225	230	235	240
gga tat gcc aga gga gaa ggt gtt tgc tct att gtc ctg aaa acg ctg			
768			
Gly Tyr Ala Arg Gly Glu Gly Val Cys Ser Ile Val Leu Lys Thr Leu			
245	250	255	
agc cag gca ctg cgc gac ggg gac agt atc gag tgt gtt atc cga gag			
816			
Ser Gln Ala Leu Arg Asp Gly Asp Ser Ile Glu Cys Val Ile Arg Glu			
260	265	270	
acc ggt atc aac caa gat ggc cga acg aca ggt atc aca atg cca aac			
864			
Thr Gly Ile Asn Gln Asp Gly Arg Thr Thr Gly Ile Thr Met Pro Asn			
275	280	285	
cat agc gca caa gaa gcc ctc att cgg gcc aca tat gcc aag gct ggt			
912			
His Ser Ala Gln Glu Ala Leu Ile Arg Ala Thr Tyr Ala Lys Ala Gly			
290	295	300	
ctt gat att acc aac ccc cag gaa cgc tgc cag ttc ttt gaa gcc cat			
960			
Leu Asp Ile Thr Asn Pro Gln Glu Arg Cys Gln Phe Phe Glu Ala His			
305	310	315	320
gga act ggt aca cca gcc ggt gac cca cag gaa gct gag gct att gca			
1008			
Gly Thr Gly Thr Pro Ala Gly Asp Pro Gln Glu Ala Glu Ala Ile Ala			
325	330	335	
aca gcc ttc ttc gga cac aag gat gga aca atc gac agc gac ggc gag			
1056			
Thr Ala Phe Phe Gly His Lys Asp Gly Thr Ile Asp Ser Asp Gly Glu			
340	345	350	

aaa gat gag ctt ttt gtc ggc agc atc aag aca gtt ctc ggt cac acg
1104

Lys Asp Glu Leu Phe Val Gly Ser Ile Lys Thr Val Leu Gly His Thr

355

360

365

gaa ggc act gct ggt att gcg ggc tta atg aag gca tcg ttt gct gta
1152

Glu Gly Thr Ala Gly Ile Ala Gly Leu Met Lys Ala Ser Phe Ala Val

370

375

380

cga aat ggc gtg atc ccg cca aac ctg ctg ttt gag aag atc agt ccc
1200

Arg Asn Gly Val Ile Pro Pro Asn Leu Leu Phe Glu Lys Ile Ser Pro

385

390

395

400

cgt gtc gct ccg ttc tat acg cac ttg aaa att gca acg gag gcc aca
1248

Arg Val Ala Pro Phe Tyr Thr His Leu Lys Ile Ala Thr Glu Ala Thr

405

410

415

gaa tgg ccg att gtt gcg ccc ggg cag cct cgc aga gtc agc gtt aat
1296

Glu Trp Pro Ile Val Ala Pro Gly Gln Pro Arg Arg Val Ser Val Asn

420

425

430

tca ttt gga ttt ggt ggt aca aat gcc cat gct att atc gaa gag tat
1344

Ser Phe Gly Phe Gly Gly Thr Asn Ala His Ala Ile Ile Glu Glu Tyr

435

440

445

atg gct cct cca cac aag ccg aca gca gtg gta aca gag gtg acc tca
1392

Met Ala Pro Pro His Lys Pro Thr Ala Val Val Thr Glu Val Thr Ser

450

455

460

gat gca gat gca tgc agc ttg ccc ctt gtg ctt tca tgc aag tgc cag
 1440
 Asp Ala Asp Ala Cys Ser Leu Pro Leu Val Leu Ser Ser Lys Ser Gln
 465 470 475 480

cgc tcc atg aag gca acg cta gaa aat atg ctc caa ttt ctg gaa acg
 1488
 Arg Ser Met Lys Ala Thr Leu Glu Asn Met Leu Gln Phe Leu Glu Thr
 485 490 495

cat gat gac gtg gac atg cat gat atc gca tat acc tta ctt gag aaa
 1536
 His Asp Asp Val Asp Met His Asp Ile Ala Tyr Thr Leu Leu Glu Lys
 500 505 510

cgg tct atc ttg ccc ttc cgt cgt gcg att gca gca cac aac aag gaa
 1584
 Arg Ser Ile Leu Pro Phe Arg Arg Ala Ile Ala Ala His Asn Lys Glu
 515 520 525

gta gcc cgc gcg gca ctg gag gct gcc atc gcg gac ggt gag gtc gtc
 1632
 Val Ala Arg Ala Ala Leu Glu Ala Ala Ile Ala Asp Gly Glu Val Val
 530 535 540

acc gac ttc cgc acc gac gcg aat gac aac cct cgc gta cta ggt gtc
 1680
 Thr Asp Phe Arg Thr Asp Ala Asn Asp Asn Pro Arg Val Leu Gly Val
 545 550 555 560

ttt act ggc caa ggt gca cag tgg ccg ggc atg ctg aag aag ctc atg
 1728
 Phe Thr Gly Gln Gly Ala Gln Trp Pro Gly Met Leu Lys Lys Leu Met
 565 570 575

gtg ggt atg cca ttt gtg aga ggc att ctc gaa gag ctg gat aat tca

1776
 Val Gly Met Pro Phe Val Arg Gly Ile Leu Glu Glu Leu Asp Asn Ser
 580 585 590

 ctg caa aca ctg cct gaa aag tat cgg cct acg tgg aca ctg tat gac
 1824
 Leu Gln Thr Leu Pro Glu Lys Tyr Arg Pro Thr Trp Thr Leu Tyr Asp
 595 600 605

 cag ctc atg ctt gaa ggg gat gcc tca aac gtc aga ctc gcc agc ttc
 1872
 Gln Leu Met Leu Glu Gly Asp Ala Ser Asn Val Arg Leu Ala Ser Phe
 610 615 620

 tcc cag cct cta tgc tgc gcc gta caa atc gtt ctg gtc cga ctt ctc
 1920
 Ser Gln Pro Leu Cys Cys Ala Val Gln Ile Val Leu Val Arg Leu Leu
 625 630 635 640

 gct gca gct ggt atc gag ttc agt gca att gtc ggc cac agt tca ggt
 1968
 Ala Ala Ala Gly Ile Glu Phe Ser Ala Ile Val Gly His Ser Ser Gly
 645 650 655

 gag att gcc tgt gcc ttt gcg gca gga ttc atc agt gcc act caa gct
 2016
 Glu Ile Ala Cys Ala Phe Ala Ala Gly Phe Ile Ser Ala Thr Gln Ala
 660 665 670

 atc cgt att gcg cat ctg cgt gga gtt gtg tcc gcg gag cat gcc tct
 2064
 Ile Arg Ile Ala His Leu Arg Gly Val Val Ser Ala Glu His Ala Ser
 675 680 685

 tct cca agc ggc cag aca ggc gct atg cta gcg gca ggt atg tcg tac
 2112

Ser Pro Ser Gly Gln Thr Gly Ala Met Leu Ala Ala Gly Met Ser Tyr
690 695 700

gat gac gca aag gaa cta tgc gag ctc gaa gcc ttt gag ggt cgg gtc
2160
Asp Asp Ala Lys Glu Leu Cys Glu Leu Glu Ala Phe Glu Gly Arg Val
705 710 715 720

tgc gtc gcc gct agc aat tca ccg gat agt gtg acc ttc tcc ggc gac
2208
Cys Val Ala Ala Ser Asn Ser Pro Asp Ser Val Thr Phe Ser Gly Asp
725 730 735

atg gat gct atc cag cac gtt gaa ggt gtc ttg gag gat gaa tcc act
2256
Met Asp Ala Ile Gln His Val Glu Gly Val Leu Glu Asp Glu Ser Thr
740 745 750

ttt gcc aga atc ttg aga gtt gac aag gcc tac cat tcg cat cac atg
2304
Phe Ala Arg Ile Leu Arg Val Asp Lys Ala Tyr His Ser His His Met
755 760 765

cac cca tgc gca gct cca tat gtc aag gca ttg ctg gag tgc gac tgt
2352
His Pro Cys Ala Ala Pro Tyr Val Lys Ala Leu Leu Glu Cys Asp Cys
770 775 780

gct gtt gcc gat ggc caa ggt aac gat agt gtt gct tgg ttc tct gcc
2400
Ala Val Ala Asp Gly Gln Gly Asn Asp Ser Val Ala Trp Phe Ser Ala
785 790 795 800

gtc cac gag acc agc aag caa atg act gta cag gat gtg atg ccc gct
2448
Val His Glu Thr Ser Lys Gln Met Thr Val Gln Asp Val Met Pro Ala

805	810	815
tat tgg aaa gac aat ctc gtc tct ccg gtc ttg ttc tcg cag gct gtg		
2496		
Tyr Trp Lys Asp Asn Leu Val Ser Pro Val Leu Phe Ser Gln Ala Val		
820	825	830
cag aaa gca gtc atc act cat cgt cta atc gac gtc gcc atc gaa att		
2544		
Gln Lys Ala Val Ile Thr His Arg Leu Ile Asp Val Ala Ile Glu Ile		
835	840	845
ggc gcc cac cct gct ctc aag ggt ccg tgt cta gcc acc atc aag gat		
2592		
Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp		
850	855	860
gct ctt gcc ggt gtg gag ctg ccg tat acc ggg tgc ttg gca cga aac		
2640		
Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn		
865	870	875
gtt gac gat gtg gac gct ttt gct gga ggt ctg gga tac att tgg gag		
2688		
Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu		
885	890	895
cgt ttc gga gtt cgg agt atc gac gcc gag ggc ttc gta caa caa gtc		
2736		
Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val		
900	905	910
cgg ccc gat cgt gcc gtt caa aac ctg tca aag tca ttg ccc aca tac		
2784		
Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr		

915	920	925
tct tgg gat cat act cgt caa tac tgg gca gaa tct cgc tcc acc cgc		
2832		
Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg		
930	935	940
cag cat ctt cgt gga ggt gcg ccc cat ctt ctg ctt gga aag ctt tct		
2880		
Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Leu Gly Lys Leu Ser		
945	950	955
tct tac agc aca gca tcg acc ttc cag tgg aca aac ttc atc agg ccc		
2928		
Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro		
965	970	975
cgg gat ctg gaa tgg ctc gac ggt cat gcg cta caa ggc cag act gtg		
2976		
Arg Asp Leu Glu Trp Leu Asp Gly His Ala Leu Gln Gly Gln Thr Val		
980	985	990
ttc ccc gct gct ggg tac ata att atg gcc atg gaa gct gcc atg aag		
3024		
Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys		
995	1000	1005
gtg gct ggt gag cgt gcc gcc caa gtt cag ctc ctg gaa atc ttg		
3069		
Val Ala Gly Glu Arg Ala Ala Gln Val Gln Leu Leu Glu Ile Leu		
1010	1015	1020
gac atg agc atc aac aaa gcc atc gtg ttt gaa gat gaa aac acc		
3114		
Asp Met Ser Ile Asn Lys Ala Ile Val Phe Glu Asp Glu Asn Thr		
1025	1030	1035

tcc gtg gag ctg aac ttg aca gcc gaa gtc acc agt gac aat gat
 3159
 Ser Val Glu Leu Asn Leu Thr Ala Glu Val Thr Ser Asp Asn Asp

1040

1045

1050

gcg gat ggc caa gtc acg gtc aaa ttt gtt att gat tcc tgt ctg
 3204
 Ala Asp Gly Gln Val Thr Val Lys Phe Val Ile Asp Ser Cys Leu

1055

1060

1065

gca aag gag agt gag ctt tcg aca tcc gcc aaa ggc caa atc gtc
 3249
 Ala Lys Glu Ser Glu Leu Ser Thr Ser Ala Lys Gly Gln Ile Val

1070

1075

1080

ata acc ctt ggc gag gca tca ccg tca tcg cag ctt ttg ccg cca
 3294
 Ile Thr Leu Gly Glu Ala Ser Pro Ser Ser Gln Leu Leu Pro Pro

1085

1090

1095

cct gag gaa gag tac ccc cag atg aac aat gtc aac atc gat ttc
 3339
 Pro Glu Glu Glu Tyr Pro Gln Met Asn Asn Val Asn Ile Asp Phe

1100

1105

1110

ttc tat cgg gaa ctt gac ctc ctt ggg tat gac tac agc aaa gac
 3384
 Phe Tyr Arg Glu Leu Asp Leu Leu Gly Tyr Asp Tyr Ser Lys Asp

1115

1120

1125

ttc cgt cgt ttg cag acc atg aga agg gcc gac tcc aaa gct agc
 3429
 Phe Arg Arg Leu Gln Thr Met Arg Arg Ala Asp Ser Lys Ala Ser

1130

1135

1140

3789	Asn Ile	Val Phe Lys Pro Phe	Ser Pro Pro Thr Ala	Ser Thr Asp
1250			1255	1260
cac cga	atc ttc gca aag tgg	gtc tgg gga ccc ctc	acg ccc gaa	
3834	His Arg	Ile Phe Ala Lys Trp	Val Trp Gly Pro Leu	Thr Pro Glu
1265			1270	1275
aaa ctg	ctg gag gac cct gcg	acg ttg atc ata gct	cgg gac aag	
3879	Lys Leu	Leu Glu Asp Pro Ala	Thr Leu Ile Ile Ala	Arg Asp Lys
1280			1285	1290
gag gac	att ctg acc atc gag	cga atc gtt tac ttc	tac atc aaa	
3924	Glu Asp	Ile Leu Thr Ile Glu	Arg Ile Val Tyr Phe	Tyr Ile Lys
1295			1300	1305
tcc ttc	cta gcc cag ata acc	ccc gac gac cgt caa	aat gcc gac	
3969	Ser Phe	Leu Ala Gln Ile Thr	Pro Asp Asp Arg Gln	Asn Ala Asp
1310			1315	1320
ctc cat	tcc cag aag tac att	gaa tgg tgt gac cag	gtt cag gcc	
4014	Leu His	Ser Gln Lys Tyr Ile	Glu Trp Cys Asp Gln	Val Gln Ala
1325			1330	1335
gat gct	cgg gct ggc cac cat	cag tgg tac cag gag	tct tgg gag	
4059	Asp Ala	Arg Ala Gly His His	Gln Trp Tyr Gln Glu	Ser Trp Glu
1340			1345	1350
gag gac	act tct gtt cac att	gag caa atg tgt gaa	agc aac tcg	
4104				

Glu Asp	Thr Ser Val His Ile	Glu Gln Met Cys Glu	Ser Asn Ser
1355	1360	1365	

tcc cac	cca cat gtg cgc ctg	atc caa agg gta ggc	aaa gaa tta
4149			
Ser His	Pro His Val Arg Leu	Ile Gln Arg Val Gly	Lys Glu Leu
1370	1375	1380	

att tca	att gtt cgc ggg aac	ggg gat cct ttg gat	atc atg aac
4194			
Ile Ser	Ile Val Arg Gly Asn	Gly Asp Pro Leu Asp	Ile Met Asn
1385	1390	1395	

cgc gat	ggg ttg ttc acc gag	tac tat acc aac aag	ctc gcc ttt
4239			
Arg Asp	Gly Leu Phe Thr Glu	Tyr Tyr Thr Asn Lys	Leu Ala Phe
1400	1405	1410	

ggc tca	gca ata cac gtc gtt	cag gat ctg gtt agc	caa att gct
4284			
Gly Ser	Ala Ile His Val Val	Gln Asp Leu Val Ser	Gln Ile Ala
1415	1420	1425	

cat cgc	tac caa tcc att gat	atc ctt gag atc ggc	ttg ggt aca
4329			
His Arg	Tyr Gln Ser Ile Asp	Ile Leu Glu Ile Gly	Leu Gly Thr
1430	1435	1440	

ggc atc	gcc acg aag cgc gtt	ctt gca tca cct caa	ctt ggt ttc
4374			
Gly Ile	Ala Thr Lys Arg Val	Leu Ala Ser Pro Gln	Leu Gly Phe
1445	1450	1455	

aac agt	tac act tgc act gac	atc tcg gcg gat gtt	att ggc aag
4419			
Asn Ser	Tyr Thr Cys Thr Asp	Ile Ser Ala Asp Val	Ile Gly Lys

1460		1465		1470
gcc cgt	gaa caa ctt tcc gaa	ttc gac ggt ctc atg	cag ttt gag	
4464				
Ala Arg	Glu Gln Leu Ser Glu	Phe Asp Gly Leu Met	Gln Phe Glu	
1475		1480		1485
gca cta	gac atc aac aga agc	cca gca gag caa gga	ttc aag cct	
4509				
Ala Leu	Asp Ile Asn Arg Ser	Pro Ala Glu Gln Gly	Phe Lys Pro	
1490		1495		1500
cac tcc	tac gat ctg att att	gca tcc gat gtc ctc	cat gcc agc	
4554				
His Ser	Tyr Asp Leu Ile Ile	Ala Ser Asp Val Leu	His Ala Ser	
1505		1510		1515
tcc aac	ttc gag gaa aaa ttg	gct cac ata agg tcc	ttg ctc aag	
4599				
Ser Asn	Phe Glu Glu Lys Leu	Ala His Ile Arg Ser	Leu Leu Lys	
1520		1525		1530
ccg ggt	ggt cac ttg gtt act	ttc ggg gtc acc cat	cgc gag cct	
4644				
Pro Gly	Gly His Leu Val Thr	Phe Gly Val Thr His	Arg Glu Pro	
1535		1540		1545
gct cgc	ctc gcc ttc atc tct	ggg ctt ttc gct gat	cga tgg act	
4689				
Ala Arg	Leu Ala Phe Ile Ser	Gly Leu Phe Ala Asp	Arg Trp Thr	
1550		1555		1560
gga gaa	gac gaa act cgt gct	ttg agt gcc tcg ggg	tcc gtt gac	
4734				
Gly Glu	Asp Glu Thr Arg Ala	Leu Ser Ala Ser Gly	Ser Val Asp	

1565	1570	1575
caa tgg gag cat acc ctc aag aga gtt ggg ttc tct ggc gtc gat 4779		
Gln Trp Glu His Thr Leu Lys Arg Val Gly Phe Ser Gly Val Asp		
1580	1585	1590
agt cgg aca ctt gat cga gag gat gat ttg atc ccg tct gtc ttc 4824		
Ser Arg Thr Leu Asp Arg Glu Asp Asp Leu Ile Pro Ser Val Phe		
1595	1600	1605
agt aca cat gct gtg gat gcc acc gtt gag cgt ttg tat gat cca 4869		
Ser Thr His Ala Val Asp Ala Thr Val Glu Arg Leu Tyr Asp Pro		
1610	1615	1620
ctt tct gct cca ttg aag gac tca tac ccg cca tta gtg gtt atc 4914		
Leu Ser Ala Pro Leu Lys Asp Ser Tyr Pro Pro Leu Val Val Ile		
1625	1630	1635
ggg ggc gaa tcg aca aaa acc gaa cgc att ttg aac gac atg aaa 4959		
Gly Gly Glu Ser Thr Lys Thr Glu Arg Ile Leu Asn Asp Met Lys		
1640	1645	1650
gct gcc cta ccg cat aga cac atc cac tcc gtc aag cgg ctg gaa 5004		
Ala Ala Leu Pro His Arg His Ile His Ser Val Lys Arg Leu Glu		
1655	1660	1665
agt gtt ctc gac gac ccg gcc ttg cag cct aag tcg act ttt gtc 5049		
Ser Val Leu Asp Asp Pro Ala Leu Gln Pro Lys Ser Thr Phe Val		
1670	1675	1680

atc ctc tcg gaa ctt gat gat gaa gtg ttt tgc aac ctt gaa gag
 5094
 Ile Leu Ser Glu Leu Asp Asp Glu Val Phe Cys Asn Leu Glu Glu

1685

1690

1695

gac aag ttt gag gca gtc aag tct ctt ctc ttc tac gcc gga cgc
 5139
 Asp Lys Phe Glu Ala Val Lys Ser Leu Leu Phe Tyr Ala Gly Arg

1700

1705

1710

atg atg tgg ctg aca gag aat gcc tgg att gat cat ccc cac cag
 5184
 Met Met Trp Leu Thr Glu Asn Ala Trp Ile Asp His Pro His Gln

1715

1720

1725

gcc agc acc atc gga atg ttg agg aca atc aag ctc gag aac cct
 5229
 Ala Ser Thr Ile Gly Met Leu Arg Thr Ile Lys Leu Glu Asn Pro

1730

1735

1740

gac ttg gga acg cac gtc ttc gat gtc gat act gtg gag aac cta
 5274
 Asp Leu Gly Thr His Val Phe Asp Val Asp Thr Val Glu Asn Leu

1745

1750

1755

gac acc aaa ttc ttc gtt gag caa ctt ttg cgc ttc gag gag agc
 5319
 Asp Thr Lys Phe Phe Val Glu Gln Leu Leu Arg Phe Glu Glu Ser

1760

1765

1770

gat gat cag ctt ttg gaa tca ata aca tgg act cat gag ccc gaa
 5364
 Asp Asp Gln Leu Leu Glu Ser Ile Thr Trp Thr His Glu Pro Glu

1775

1780

1785

gtg tac tgg tgc aag ggt cgt gcc tgg gtc cct cgt ttg aag cag
5409
Val Tyr Trp Cys Lys Gly Arg Ala Trp Val Pro Arg Leu Lys Gln
1790 1795 1800

gat att gct agg aac gac cgt atg aac tcg tct cgt cgt cca att
5454
Asp Ile Ala Arg Asn Asp Arg Met Asn Ser Ser Arg Arg Pro Ile
1805 1810 1815

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5499
Phe Gly Asn Phe Asn Ser Ser Lys Thr Ala Ile Ala Leu Lys Glu
1820 1825 1830

gcg agg gga gca tcc tca tcg atg tac tat ctt gag tca acc gag
5544
Ala Arg Gly Ala Ser Ser Ser Met Tyr Tyr Leu Glu Ser Thr Glu
1835 1840 1845

acg tgt gat tcg tta gaa gac gct cgt cat gct gga aaa gca act
5589
Thr Cys Asp Ser Leu Glu Asp Ala Arg His Ala Gly Lys Ala Thr
1850 1855 1860

gtt cgt gtt cgc tac gct ctt ccc cag gca att cgc gtg ggc cat
5634
Val Arg Val Arg Tyr Ala Leu Pro Gln Ala Ile Arg Val Gly His
1865 1870 1875

ctc gga tac ttc cat gtc gtg cag ggc agt att ctg gag aat aca
5679
Leu Gly Tyr Phe His Val Val Gln Gly Ser Ile Leu Glu Asn Thr
1880 1885 1890

tgt gag gtg cct gta gtc gcc ctg gct gag aag aat gga tct ata

5724	Cys	Glu	Val	Pro	Val	Val	Ala	Leu	Ala	Glu	Lys	Asn	Gly	Ser	Ile
	1895						1900						1905		
ctg cat	gta	ccg	aga	aac	tac	atg	cat	agt	ctg	ccc	gat	aac	atg		
5769	Leu	His	Val	Pro	Arg	Asn	Tyr	Met	His	Ser	Leu	Pro	Asp	Asn	Met
	1910						1915						1920		
gcg gaa	ggc	gag	gat	agt	tcc	ttc	ttg	ttg	tcc	aca	gct	gca	gcc		
5814	Ala	Glu	Gly	Glu	Asp	Ser	Ser	Phe	Leu	Leu	Ser	Thr	Ala	Ala	Ala
	1925						1930						1935		
ctc ctt	gcc	gaa	aca	att	ctc	tct	agc	gct	cag	tcc	ttt	ggc	tct		
5859	Leu	Leu	Ala	Glu	Thr	Ile	Leu	Ser	Ser	Ala	Gln	Ser	Phe	Gly	Ser
	1940						1945						1950		
gat gca	tca	att	ctg	att	atg	gag	ccc	cca	atc	ttc	tgc	gtc	aaa		
5904	Asp	Ala	Ser	Ile	Leu	Ile	Met	Glu	Pro	Pro	Ile	Phe	Cys	Val	Lys
	1955						1960						1965		
gca att	ctg	gag	tcg	gcc	aaa	acc	tac	ggc	gtt	cag	gtt	cat	ttg		
5949	Ala	Ile	Leu	Glu	Ser	Ala	Lys	Thr	Tyr	Gly	Val	Gln	Val	His	Leu
	1970						1975						1980		
gca aca	act	ctg	tcc	gac	gtc	aaa	act	att	ccg	gct	cct	tgg	atc		
5994	Ala	Thr	Thr	Leu	Ser	Asp	Val	Lys	Thr	Ile	Pro	Ala	Pro	Trp	Ile
	1985						1990						1995		
cga tta	cat	gcc	aag	gaa	acc	gac	gct	cgg	ctg	aaa	cac	agc	ctg		
6039															

Arg Leu	His Ala Lys Glu Thr	Asp Ala Arg Leu Lys	His Ser Leu
2000	2005	2010	
ccg aca 6084	aac atg atg gca ttc	ttt gac ttg tct acc	gac cgg act
Pro Thr	Asn Met Met Ala Phe	Phe Asp Leu Ser Thr	Asp Arg Thr
2015	2020	2025	
gct gcc 6129	ggg ata acc aac cgt	ttg gcc aag ttg cta	cca ccc agt
Ala Ala	Gly Ile Thr Asn Arg	Leu Ala Lys Leu Leu	Pro Pro Ser
2030	2035	2040	
tgc ttc 6174	atg tac agt ggt gac	tat ctt atc cga agt	aca gct tcc
Cys Phe	Met Tyr Ser Gly Asp	Tyr Leu Ile Arg Ser	Thr Ala Ser
2045	2050	2055	
aca tac 6219	aaa gtt agt cat gtt	gag gat att cca atc	ctc gag cac
Thr Tyr	Lys Val Ser His Val	Glu Asp Ile Pro Ile	Leu Glu His
2060	2065	2070	
tct gtg 6264	gca atg gca aaa aat	acc gtc tct gcg tcg	act gtc gac
Ser Val	Ala Met Ala Lys Asn	Thr Val Ser Ala Ser	Thr Val Asp
2075	2080	2085	
gac act 6309	gag aaa gtt att aca	gcc aca caa att ctc	ttg cct ggt
Asp Thr	Glu Lys Val Ile Thr	Ala Thr Gln Ile Leu	Leu Pro Gly
2090	2095	2100	
cag ctc 6354	tct gtc aac cac aat	gac caa cgc ttc aat	ctg gcc acc
Gln Leu	Ser Val Asn His Asn	Asp Gln Arg Phe Asn	Leu Ala Thr

2105	2110	2115
gtc atc 6399	gac tgg aag gaa aat	gag gtg tcc gct agg att tgc ccc
Val Ile	Asp Trp Lys Glu Asn	Glu Val Ser Ala Arg Ile Cys Pro
2120	2125	2130
atc gac 6444	tct ggt aac tta ttt	tcc aac aag aag acg tat ttg ctt
Ile Asp	Ser Gly Asn Leu Phe	Ser Asn Lys Lys Thr Tyr Leu Leu
2135	2140	2145
gtt ggt 6489	ctt acc ggg gac ctt	ggc cgc tct ctc tgt cgc tgg atg
Val Gly	Leu Thr Gly Asp Leu	Gly Arg Ser Leu Cys Arg Trp Met
2150	2155	2160
atc ttg 6534	cat ggc gcc cgc cat	gtt gtg ctc act agc cgg aac cct
Ile Leu	His Gly Ala Arg His	Val Val Leu Thr Ser Arg Asn Pro
2165	2170	2175
cga ctt 6579	gat ccc aaa tgg atc	gcc aac atg gag gca ctt ggt ggt
Arg Leu	Asp Pro Lys Trp Ile	Ala Asn Met Glu Ala Leu Gly Gly
2180	2185	2190
gac atc 6624	acc gtt ctg tca atg	gat gtt gcc aat gag gat tca gtc
Asp Ile	Thr Val Leu Ser Met	Asp Val Ala Asn Glu Asp Ser Val
2195	2200	2205
gat gct 6669	ggc ctt ggc aag ctt	gtc gat atg aag ttg cca cct gtt
Asp Ala	Gly Leu Gly Lys Leu	Val Asp Met Lys Leu Pro Pro Val

2210	2215	2220
gcc ggc atc gcg ttc ggg cct ttg gtg ctg cag gat gtc atg ctg 6714		
Ala Gly Ile Ala Phe Gly Pro Leu Val Leu Gln Asp Val Met Leu		
2225	2230	2235
aag aac atg gac cac cag atg atg gac atg gtg ttg aag ccc aag 6759		
Lys Asn Met Asp His Gln Met Met Asp Met Val Leu Lys Pro Lys		
2240	2245	2250
gta caa gga gca cgc att ctt cat gaa cgg ttc tcc gaa cag acg 6804		
Val Gln Gly Ala Arg Ile Leu His Glu Arg Phe Ser Glu Gln Thr		
2255	2260	2265
ggc agc aag gcg ctc gac ttc ttc atc atg ttt tcg tcc att gtt 6849		
Gly Ser Lys Ala Leu Asp Phe Phe Ile Met Phe Ser Ser Ile Val		
2270	2275	2280
gca gtt att ggc aat cct ggc cag tcc aac tat ggc gct gcg aat 6894		
Ala Val Ile Gly Asn Pro Gly Gln Ser Asn Tyr Gly Ala Ala Asn		
2285	2290	2295
gcc tac cta cag gct ctg gcc cag caa cgg tgc gcc aga gga ttg 6939		
Ala Tyr Leu Gln Ala Leu Ala Gln Gln Arg Cys Ala Arg Gly Leu		
2300	2305	2310
gcg gga tca acc atc gat att ggt gcc gtt tac ggt gta ggg ttt 6984		
Ala Gly Ser Thr Ile Asp Ile Gly Ala Val Tyr Gly Val Gly Phe		
2315	2320	2325

gtc acg agg gcc gag atg gag gag gac ttt gat gct atc cgt ttc
7029

Val Thr Arg Ala Glu Met Glu Glu Asp Phe Asp Ala Ile Arg Phe

2330

2335

2340

atg ttt gac tca gtt gaa gag cat gag ctg cac acg ctt ttc gcc
7074

Met Phe Asp Ser Val Glu Glu His Glu Leu His Thr Leu Phe Ala

2345

2350

2355

gaa gcg gtc gtg tct gac cag cgt gcc cgg cag caa cca cag cgc
7119

Glu Ala Val Val Ser Asp Gln Arg Ala Arg Gln Gln Pro Gln Arg

2360

2365

2370

aag acg gtc att gac atg gcg gac ctt gag ctt acc acg ggt atc
7164

Lys Thr Val Ile Asp Met Ala Asp Leu Glu Leu Thr Thr Gly Ile

2375

2380

2385

cca gat ctt gac cct gcg ctt caa gat cga att att tac ttc aac
7209

Pro Asp Leu Asp Pro Ala Leu Gln Asp Arg Ile Ile Tyr Phe Asn

2390

2395

2400

gac cct cgt ttc gga aac ttc aaa att ccc ggt caa cgc gga gac
7254

Asp Pro Arg Phe Gly Asn Phe Lys Ile Pro Gly Gln Arg Gly Asp

2405

2410

2415

ggt ggc gac aat gga tca ggg tct aaa ggc tcc att gcc gac cag
7299

Gly Gly Asp Asn Gly Ser Gly Ser Lys Gly Ser Ile Ala Asp Gln

2420

2425

2430

ctc aaa	caa gca aca act tta	gac caa gtt cgg caa	atc gtg att
7344			
Leu Lys	Gln Ala Thr Thr Leu	Asp Gln Val Arg Gln	Ile Val Ile
2435	2440	2445	

gat ggt	cta tct gag aaa ctc	cgt gtt acc ctc caa	gtt tcg gac
7389			
Asp Gly	Leu Ser Glu Lys Leu	Arg Val Thr Leu Gln	Val Ser Asp
2450	2455	2460	

ggg gag	agc gtg gac cca acc	att cct ctc att gat	caa ggt gtc
7434			
Gly Glu	Ser Val Asp Pro Thr	Ile Pro Leu Ile Asp	Gln Gly Val
2465	2470	2475	

gac tcc	ttg ggt gca gtg act	gtc ggc tca tgg ttc	tca aag caa
7479			
Asp Ser	Leu Gly Ala Val Thr	Val Gly Ser Trp Phe	Ser Lys Gln
2480	2485	2490	

ctc tac	ctt gac ctc cca ctc	ttg agg gta ctt ggc	ggg gct tct
7524			
Leu Tyr	Leu Asp Leu Pro Leu	Leu Arg Val Leu Gly	Gly Ala Ser
2495	2500	2505	

gtc gct	gat ctt gcc gac gac	gcg gcc acc cga ctc	cca gct aca
7569			
Val Ala	Asp Leu Ala Asp Asp	Ala Ala Thr Arg Leu	Pro Ala Thr
2510	2515	2520	

tcc att	ccg ctg ctg ttg caa	att ggt gat tcc acg	gga acc tcg
7614			
Ser Ile	Pro Leu Leu Leu Gln	Ile Gly Asp Ser Thr	Gly Thr Ser
2525	2530	2535	

gac agc	ggg gct tct ccg aca	cca aca gac agc cat	gat gaa gca
---------	---------------------	---------------------	-------------

7659	Asp Ser Gly Ala Ser Pro Thr	Pro Thr Asp Ser His	Asp Glu Ala
2540		2545	2550
agc tct 7704	gct acc agc aca gat	gcg tcg tca gcc gaa	gag gat gaa
Ser Ser	Ala Thr Ser Thr Asp	Ala Ser Ser Ala Glu	Glu Asp Glu
2555		2560	2565
gag caa 7749	gag gac gat aat gag	cag gga ggc cgt aag	att ctt cgt
Glu Gln	Glu Asp Asp Asn Glu	Gln Gly Gly Arg Lys	Ile Leu Arg
2570		2575	2580
cgc gag 7794	agg ttg tcc ctt ggc	cag gag tat tcc tgg	agg cag caa
Arg Glu	Arg Leu Ser Leu Gly	Gln Glu Tyr Ser Trp	Arg Gln Gln
2585		2590	2595
caa atg 7839	gta aaa gat cat acc	atc ttc aac aac act	att ggc atg
Gln Met	Val Lys Asp His Thr	Ile Phe Asn Asn Thr	Ile Gly Met
2600		2605	2610
ttc atg 7884	aag ggt acc att gac	ctc gac cgg ttg agg	cgg gct ctg
Phe Met	Lys Gly Thr Ile Asp	Leu Asp Arg Leu Arg	Arg Ala Leu
2615		2620	2625
aaa gcc 7929	tca ttg cgc cgt cac	gag atc ttc cgt acg	tgc ttt gtt
Lys Ala	Ser Leu Arg Arg His	Glu Ile Phe Arg Thr	Cys Phe Val
2630		2635	2640
act ggc 7974	gat gac tat agc agc	gat tta aat ggt ccc	gtc caa gtg

Thr Gly	Asp Asp Tyr Ser Ser	Asp Leu Asn Gly Pro	Val Gln Val
2645	2650	2655	
gtt ctc 8019	aag aac ccg gag aac	aga gtg cac ttt gtt	cag gtg aac
Val Leu	Lys Asn Pro Glu Asn	Arg Val His Phe Val	Gln Val Asn
2660	2665	2670	
aac gct 8064	gcg gag gca gag gaa	gag tac cgg aaa ctc	gag aag aca
Asn Ala	Ala Glu Ala Glu Glu	Glu Tyr Arg Lys Leu	Glu Lys Thr
2675	2680	2685	
aac tat 8109	agc atc tcc aca ggt	gac act ctc aga ctc	gtt gat ttc
Asn Tyr	Ser Ile Ser Thr Gly	Asp Thr Leu Arg Leu	Val Asp Phe
2690	2695	2700	
tac tgg 8154	ggc aca gat gac cac	ctg ttg gta atc ggc	tac cac aga
Tyr Trp	Gly Thr Asp Asp His	Leu Leu Val Ile Gly	Tyr His Arg
2705	2710	2715	
tta gtt 8199	ggt gat ggc tca aca	aca gaa aac ctg ttc	aat gag atc
Leu Val	Gly Asp Gly Ser Thr	Thr Glu Asn Leu Phe	Asn Glu Ile
2720	2725	2730	
ggg cag 8244	att tac agc ggg gtg	aaa atg cag cga cca	tcg acc caa
Gly Gln	Ile Tyr Ser Gly Val	Lys Met Gln Arg Pro	Ser Thr Gln
2735	2740	2745	
ttc tct 8289	gat cta gcc gtc caa	cag cgg gaa aac ctg	gaa aat ggg
Phe Ser	Asp Leu Ala Val Gln	Gln Arg Glu Asn Leu	Glu Asn Gly

2750	2755	2760
cga atg ggg gac gat atc gcg ttc tgg aag tcc atg cat agc aaa 8334		
Arg Met Gly Asp Asp Ile Ala Phe Trp Lys Ser Met His Ser Lys		
2765	2770	2775
gtc tcg tca tct gcg cca acc gtg ctt ccc atc atg aat ctg atc 8379		
Val Ser Ser Ser Ala Pro Thr Val Leu Pro Ile Met Asn Leu Ile		
2780	2785	2790
aat gac cct gct gcc aat tca gag cag cag caa ata cag cca ttc 8424		
Asn Asp Pro Ala Ala Asn Ser Glu Gln Gln Gln Ile Gln Pro Phe		
2795	2800	2805
acg tgg cag cag tat gaa gca att gct cgt tta gat ccc atg gtc 8469		
Thr Trp Gln Gln Tyr Glu Ala Ile Ala Arg Leu Asp Pro Met Val		
2810	2815	2820
gcc ttc cga atc aaa gag cgg agc cgc aag cac aag gca acc ccc 8514		
Ala Phe Arg Ile Lys Glu Arg Ser Arg Lys His Lys Ala Thr Pro		
2825	2830	2835
atg cag ttc tac ctg gcc gcc tac cac gtt ttg ttg gcg cgt ctt 8559		
Met Gln Phe Tyr Leu Ala Ala Tyr His Val Leu Leu Ala Arg Leu		
2840	2845	2850
acc ggc agc aaa gac ata acc atc ggc ctc gcc gaa acc aac cga 8604		
Thr Gly Ser Lys Asp Ile Thr Ile Gly Leu Ala Glu Thr Asn Arg		

2855	2860	2865
tcc acc atg gaa gaa att tcg gcg atg ggc ttt ttc gct aac gtg 8649		
Ser Thr Met Glu Glu Ile Ser Ala Met Gly Phe Phe Ala Asn Val		
2870	2875	2880
ctt ccc ctg cgc ttt gat gag ttc gtc ggc agc aag aca ttc ggc 8694		
Leu Pro Leu Arg Phe Asp Glu Phe Val Gly Ser Lys Thr Phe Gly		
2885	2890	2895
gag cac ctt gta gcc acc aag gac agt gtg cgt gag gcc atg caa 8739		
Glu His Leu Val Ala Thr Lys Asp Ser Val Arg Glu Ala Met Gln		
2900	2905	2910
cac gcg cgg gtg ccg tat ggc gtc atc ctc gac tgt cta ggc ctg 8784		
His Ala Arg Val Pro Tyr Gly Val Ile Leu Asp Cys Leu Gly Leu		
2915	2920	2925
aat ctc cct acc tca ggc gag gaa ccc aag act cag aca cac gcc 8829		
Asn Leu Pro Thr Ser Gly Glu Glu Pro Lys Thr Gln Thr His Ala		
2930	2935	2940
ccc ttg ttc cag gct gtc ttt gat tac aag cag ggt caa gcg gag 8874		
Pro Leu Phe Gln Ala Val Phe Asp Tyr Lys Gln Gly Gln Ala Glu		
2945	2950	2955
agt ggc tca att ggc aat gcc aaa atg acg agt gtt ctc gct tcc 8919		
Ser Gly Ser Ile Gly Asn Ala Lys Met Thr Ser Val Leu Ala Ser		
2960	2965	2970

cgt gag cgc act cct tat gac atc gtt ctc gag atg tgg gat gac
 8964
 Arg Glu Arg Thr Pro Tyr Asp Ile Val Leu Glu Met Trp Asp Asp
 2975 2980 2985

cct acc aag gac cca ctc att cat gtc aaa ctt cag agc tcg ctg
 9009
 Pro Thr Lys Asp Pro Leu Ile His Val Lys Leu Gln Ser Ser Leu
 2990 2995 3000

tat ggc cct gag cac gct cag gcc ttt gta gac cac ttt tct tca
 9054
 Tyr Gly Pro Glu His Ala Gln Ala Phe Val Asp His Phe Ser Ser
 3005 3010 3015

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 9099
 Ile Leu Thr Met Phe Ser Met Asn Pro Ala Leu Lys Leu Ala
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<210> 44

<211> 3032

<212> PRT

<213> Penicillium citrinum

<400> 44

Met Asp Gln Ala Asn Tyr Pro Asn Glu Pro Ile Val Val Val Gly Ser
 1 5 10 15

Gly Cys Arg Phe Pro Gly Gly Val Asn Thr Pro Ser Lys Leu Trp Glu
 20 25 30

Leu	Leu	Lys	Glu	Pro	Arg	Asp	Val	Gln	Thr	Lys	Ile	Pro	Lys	Glu	Arg
		35					40					45			
Phe	Asp	Val	Asp	Thr	Phe	Tyr	Ser	Pro	Asp	Gly	Thr	His	Pro	Gly	Arg
	50					55					60				
Thr	Asn	Ala	Pro	Phe	Ala	Tyr	Leu	Leu	Gln	Glu	Asp	Leu	Arg	Gly	Phe
65					70					75					80
Asp	Ala	Ser	Phe	Phe	Asn	Ile	Gln	Ala	Gly	Glu	Ala	Glu	Thr	Ile	Asp
				85					90					95	
Pro	Gln	Gln	Arg	Leu	Leu	Leu	Glu	Thr	Val	Tyr	Glu	Ala	Val	Ser	Asn
			100					105					110		
Ala	Gly	Leu	Arg	Ile	Gln	Gly	Leu	Gln	Gly	Ser	Ser	Thr	Ala	Val	Tyr
		115					120					125			
Val	Gly	Met	Met	Thr	His	Asp	Tyr	Glu	Thr	Ile	Val	Thr	Arg	Glu	Leu
	130					135					140				
Asp	Ser	Ile	Pro	Thr	Tyr	Ser	Ala	Thr	Gly	Val	Ala	Val	Ser	Val	Ala
145					150					155					160
Ser	Asn	Arg	Val	Ser	Tyr	Phe	Phe	Asp	Trp	His	Gly	Pro	Ser	Met	Thr
				165					170					175	
Ile	Asp	Thr	Ala	Cys	Ser	Ser	Ser	Leu	Ala	Ala	Val	His	Leu	Ala	Val
			180					185					190		
Gln	Gln	Leu	Arg	Thr	Gly	Glu	Ser	Thr	Met	Ala	Val	Ala	Ala	Gly	Ala
		195					200					205			
Asn	Leu	Ile	Leu	Gly	Pro	Met	Thr	Phe	Val	Met	Glu	Ser	Lys	Leu	Asn
	210					215					220				
Met	Leu	Ser	Pro	Asn	Gly	Arg	Ser	Arg	Met	Trp	Asp	Ala	Ala	Ala	Asp
225					230					235					240

Gly	Tyr	Ala	Arg	Gly 245	Glu	Gly	Val	Cys	Ser 250	Ile	Val	Leu	Lys	Thr 255	Leu	
Ser	Gln	Ala	Leu 260	Arg	Asp	Gly	Asp	Ser 265	Ile	Glu	Cys	Val	Ile 270	Arg	Glu	
Thr	Gly	Ile 275	Asn	Gln	Asp	Gly	Arg 280	Thr	Thr	Gly	Ile	Thr 285	Met	Pro	Asn	
His	Ser 290	Ala	Gln	Glu	Ala	Leu 295	Ile	Arg	Ala	Thr	Tyr 300	Ala	Lys	Ala	Gly	
Leu 305	Asp	Ile	Thr	Asn	Pro 310	Gln	Glu	Arg	Cys	Gln 315	Phe	Phe	Glu	Ala	His 320	
Gly	Thr	Gly	Thr	Pro 325	Ala	Gly	Asp	Pro	Gln 330	Glu	Ala	Glu	Ala	Ile 335	Ala	
Thr	Ala	Phe	Phe 340	Gly	His	Lys	Asp	Gly 345	Thr	Ile	Asp	Ser	Asp 350	Gly	Glu	
Lys	Asp	Glu 355	Leu	Phe	Val	Gly	Ser 360	Ile	Lys	Thr	Val	Leu 365	Gly	His	Thr	
Glu	Gly 370	Thr	Ala	Gly	Ile	Ala 375	Gly	Leu	Met	Lys	Ala 380	Ser	Phe	Ala	Val	
Arg 385	Asn	Gly	Val	Ile	Pro 390	Pro	Asn	Leu	Leu	Phe 395	Glu	Lys	Ile	Ser	Pro 400	
Arg	Val	Ala	Pro	Phe 405	Tyr	Thr	His	Leu	Lys 410	Ile	Ala	Thr	Glu	Ala 415	Thr	
Glu	Trp	Pro	Ile 420	Val	Ala	Pro	Gly	Gln 425	Pro	Arg	Arg	Val	Ser 430	Val	Asn	
Ser	Phe	Gly	Phe	Gly	Gly	Thr	Asn	Ala	His	Ala	Ile	Ile	Glu	Glu	Tyr	

435					440					445					
Met	Ala	Pro	Pro	His	Lys	Pro	Thr	Ala	Val	Val	Thr	Glu	Val	Thr	Ser
450						455					460				
Asp	Ala	Asp	Ala	Cys	Ser	Leu	Pro	Leu	Val	Leu	Ser	Ser	Lys	Ser	Gln
465					470					475					480
Arg	Ser	Met	Lys	Ala	Thr	Leu	Glu	Asn	Met	Leu	Gln	Phe	Leu	Glu	Thr
				485					490					495	
His	Asp	Asp	Val	Asp	Met	His	Asp	Ile	Ala	Tyr	Thr	Leu	Leu	Glu	Lys
			500					505					510		
Arg	Ser	Ile	Leu	Pro	Phe	Arg	Arg	Ala	Ile	Ala	Ala	His	Asn	Lys	Glu
		515					520					525			
Val	Ala	Arg	Ala	Ala	Leu	Glu	Ala	Ala	Ile	Ala	Asp	Gly	Glu	Val	Val
	530					535					540				
Thr	Asp	Phe	Arg	Thr	Asp	Ala	Asn	Asp	Asn	Pro	Arg	Val	Leu	Gly	Val
545					550					555					560
Phe	Thr	Gly	Gln	Gly	Ala	Gln	Trp	Pro	Gly	Met	Leu	Lys	Lys	Leu	Met
				565					570					575	
Val	Gly	Met	Pro	Phe	Val	Arg	Gly	Ile	Leu	Glu	Glu	Leu	Asp	Asn	Ser
			580					585					590		
Leu	Gln	Thr	Leu	Pro	Glu	Lys	Tyr	Arg	Pro	Thr	Trp	Thr	Leu	Tyr	Asp
		595					600					605			
Gln	Leu	Met	Leu	Glu	Gly	Asp	Ala	Ser	Asn	Val	Arg	Leu	Ala	Ser	Phe
	610					615					620				
Ser	Gln	Pro	Leu	Cys	Cys	Ala	Val	Gln	Ile	Val	Leu	Val	Arg	Leu	Leu
625					630					635					640

Ala	Ala	Ala	Gly	Ile	Glu	Phe	Ser	Ala	Ile	Val	Gly	His	Ser	Ser	Gly
				645					650					655	
Glu	Ile	Ala	Cys	Ala	Phe	Ala	Ala	Gly	Phe	Ile	Ser	Ala	Thr	Gln	Ala
			660					665					670		
Ile	Arg	Ile	Ala	His	Leu	Arg	Gly	Val	Val	Ser	Ala	Glu	His	Ala	Ser
		675					680					685			
Ser	Pro	Ser	Gly	Gln	Thr	Gly	Ala	Met	Leu	Ala	Ala	Gly	Met	Ser	Tyr
	690					695					700				
Asp	Asp	Ala	Lys	Glu	Leu	Cys	Glu	Leu	Glu	Ala	Phe	Glu	Gly	Arg	Val
705					710					715					720
Cys	Val	Ala	Ala	Ser	Asn	Ser	Pro	Asp	Ser	Val	Thr	Phe	Ser	Gly	Asp
				725					730					735	
Met	Asp	Ala	Ile	Gln	His	Val	Glu	Gly	Val	Leu	Glu	Asp	Glu	Ser	Thr
			740					745					750		
Phe	Ala	Arg	Ile	Leu	Arg	Val	Asp	Lys	Ala	Tyr	His	Ser	His	His	Met
		755					760					765			
His	Pro	Cys	Ala	Ala	Pro	Tyr	Val	Lys	Ala	Leu	Leu	Glu	Cys	Asp	Cys
	770					775					780				
Ala	Val	Ala	Asp	Gly	Gln	Gly	Asn	Asp	Ser	Val	Ala	Trp	Phe	Ser	Ala
785					790					795					800
Val	His	Glu	Thr	Ser	Lys	Gln	Met	Thr	Val	Gln	Asp	Val	Met	Pro	Ala
				805					810					815	
Tyr	Trp	Lys	Asp	Asn	Leu	Val	Ser	Pro	Val	Leu	Phe	Ser	Gln	Ala	Val
			820					825					830		
Gln	Lys	Ala	Val	Ile	Thr	His	Arg	Leu	Ile	Asp	Val	Ala	Ile	Glu	Ile
		835					840					845			

Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp
850 855 860

Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn
865 870 875 880

Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu
885 890 895

Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val
900 905 910

Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr
915 920 925

Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg
930 935 940

Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Leu Gly Lys Leu Ser
945 950 955 960

Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro
965 970 975

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Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys
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Leu Gln Lys Asn Ser Lys Leu Met Leu Asp Gln Lys Asn Ile Lys Ile		
405	410	415
ccc atg tct gct caa gac tgg cct gtg aaa gat ggg act cgt cgc gca		
1296		
Pro Met Ser Ala Gln Asp Trp Pro Val Lys Asp Gly Thr Arg Arg Ala		
420	425	430
tct gtc aat aac ttc ggc ttt ggt ggt tcg aat gct cac gtc att ttg		
1344		
Ser Val Asn Asn Phe Gly Phe Gly Gly Ser Asn Ala His Val Ile Leu		
435	440	445
gaa tca tat gat cgc gca tca ttg gcc ctg cca gag gat caa gtg cat		
1392		
Glu Ser Tyr Asp Arg Ala Ser Leu Ala Leu Pro Glu Asp Gln Val His		
450	455	460
gtc aat ggt aac tct gag cat ggt agg gtt gag gat ggt tcc aaa cag		
1440		
Val Asn Gly Asn Ser Glu His Gly Arg Val Glu Asp Gly Ser Lys Gln		

465	470	475	480
agc cgc ata tac gtt gtg cgt gcc aag gac gag caa gct tgt cgg cga			
1488			
Ser Arg Ile Tyr Val Val Arg Ala Lys Asp Glu Gln Ala Cys Arg Arg			
	485	490	495
acg ata gca agc ctg cga gac tac att aaa tcc gtc gct gac att gac			
1536			
Thr Ile Ala Ser Leu Arg Asp Tyr Ile Lys Ser Val Ala Asp Ile Asp			
	500	505	510
ggg gaa ccc ttc ctc gcc agc ctc gcc tat aca cta ggc tct cgc cgt			
1584			
Gly Glu Pro Phe Leu Ala Ser Leu Ala Tyr Thr Leu Gly Ser Arg Arg			
	515	520	525
tcc att ctg cca tgg acg tca gtg tat gta gca gac agc ctt ggc ggc			
1632			
Ser Ile Leu Pro Trp Thr Ser Val Tyr Val Ala Asp Ser Leu Gly Gly			
	530	535	540
ctt gtt tct gcc ctc agc gat gag tcc aat caa cca aaa cga gcg aat			
1680			
Leu Val Ser Ala Leu Ser Asp Glu Ser Asn Gln Pro Lys Arg Ala Asn			
545	550	555	560
gag aaa gta cgg ctc gga ttt gta ttc acc ggt cag ggg gcg cag tgg			
1728			
Glu Lys Val Arg Leu Gly Phe Val Phe Thr Gly Gln Gly Ala Gln Trp			
	565	570	575
cat gca atg ggc aga gag ctg gtc aat aca ttc cca gta ttc aaa cag			
1776			
His Ala Met Gly Arg Glu Leu Val Asn Thr Phe Pro Val Phe Lys Gln			
	580	585	590

gcg att ctt gaa tgt gat ggc tac atc aag caa ctg ggc gcg agt tgg
1824

Ala Ile Leu Glu Cys Asp Gly Tyr Ile Lys Gln Leu Gly Ala Ser Trp

595

600

605

aat ttt atg gag gag ctc cac cgt gat gag ctg acg act cgg gta aat
1872

Asn Phe Met Glu Glu Leu His Arg Asp Glu Leu Thr Thr Arg Val Asn

610

615

620

gat gcc gaa tac agt cta cca ctg tca acc gct atc caa att gca ctt
1920

Asp Ala Glu Tyr Ser Leu Pro Leu Ser Thr Ala Ile Gln Ile Ala Leu

625

630

635

640

gtg cgt ctc ctt tgg tca tgg gga att cgg cca acg ggg ata acc agt
1968

Val Arg Leu Leu Trp Ser Trp Gly Ile Arg Pro Thr Gly Ile Thr Ser

645

650

655

cac tca agt gga gag gct gct gct gcc tac gca gct ggg gct tta tcc
2016

His Ser Ser Gly Glu Ala Ala Ala Tyr Ala Ala Gly Ala Leu Ser

660

665

670

gcg cgg tcg gcc att ggg atc act tat ata cgc ggt gta ttg acc act
2064

Ala Arg Ser Ala Ile Gly Ile Thr Tyr Ile Arg Gly Val Leu Thr Thr

675

680

685

aag ccc aag ccc gca ttg gca gcc aaa gga gga atg atg gcg gtg ggt
2112

Lys Pro Lys Pro Ala Leu Ala Ala Lys Gly Gly Met Met Ala Val Gly

690

695

700

ctt ggt cgc agt gag acc aat gtt tac att tcg cgt ctc aac cag gag
2160

Leu Gly Arg Ser Glu Thr Asn Val Tyr Ile Ser Arg Leu Asn Gln Glu

705

710

715

720

gac ggc tgt gtg gtg gtt gga tgt atc aac agt caa tgt agt gtg acg
2208

Asp Gly Cys Val Val Val Gly Cys Ile Asn Ser Gln Cys Ser Val Thr

725

730

735

gtg tcg gga gat ttg ggt gca atc gag aaa ctt gaa aag ttg tta cac
2256

Val Ser Gly Asp Leu Gly Ala Ile Glu Lys Leu Glu Lys Leu Leu His

740

745

750

gcc gat ggc atc ttt acc agg aaa ctg aaa gtc act gaa gcc ttc cat
2304

Ala Asp Gly Ile Phe Thr Arg Lys Leu Lys Val Thr Glu Ala Phe His

755

760

765

tca agc cac atg cga cca atg gca gat gcc ttt ggg gcg tca ctg aga
2352

Ser Ser His Met Arg Pro Met Ala Asp Ala Phe Gly Ala Ser Leu Arg

770

775

780

gat ctg ttc aac tcg gat aac aac aac gac aat ccc aat gct gac acc
2400

Asp Leu Phe Asn Ser Asp Asn Asn Asn Asp Asn Pro Asn Ala Asp Thr

785

790

795

800

tca aag ggt gta tta tat tca tca cct aag act ggt agt cgc atg acc
2448

Ser Lys Gly Val Leu Tyr Ser Ser Pro Lys Thr Gly Ser Arg Met Thr

805

810

815

gat ctt aaa ttg cta ttg gat ccc aca cac tgg atg gat agt atg cta

2496
 Asp Leu Lys Leu Leu Leu Asp Pro Thr His Trp Met Asp Ser Met Leu
 820 825 830

cag ccg gta gag ttc gag tcc tca ctc cgc gag atg tgc ttt gat ccc
 2544
 Gln Pro Val Glu Phe Glu Ser Ser Leu Arg Glu Met Cys Phe Asp Pro
 835 840 845

aac acc aaa gag aaa gcc gtc gat gtg att att gaa ata ggg cct cac
 2592
 Asn Thr Lys Glu Lys Ala Val Asp Val Ile Ile Glu Ile Gly Pro His
 850 855 860

gga gcg ctt ggt ggt cca atc aac caa gtc atg cag gat ctg ggt ctg
 2640
 Gly Ala Leu Gly Gly Pro Ile Asn Gln Val Met Gln Asp Leu Gly Leu
 865 870 875 880

aaa gga aca gat ata aac tat ctc agt tgc ctt tct cgc ggc aga agc
 2688
 Lys Gly Thr Asp Ile Asn Tyr Leu Ser Cys Leu Ser Arg Gly Arg Ser
 885 890 895

tcg ttg gag aca atg tat cgt gct gct acg gag ttg ata agc aag ggt
 2736
 Ser Leu Glu Thr Met Tyr Arg Ala Ala Thr Glu Leu Ile Ser Lys Gly
 900 905 910

tat ggg ctc aaa atg gac gct ata aac ttt cct cat gga aga aaa gag
 2784
 Tyr Gly Leu Lys Met Asp Ala Ile Asn Phe Pro His Gly Arg Lys Glu
 915 920 925

ccc aga gtg aag gta ctg agc gat ttg ccg gcg tac ccg tgg aat cac
 2832

Pro Arg Val Lys Val Leu Ser Asp Leu Pro Ala Tyr Pro Trp Asn His
930 935 940

caa acc cgt tat tgg aga gag cct cgc ggc agt cgt gag tcc aaa cag
2880
Gln Thr Arg Tyr Trp Arg Glu Pro Arg Gly Ser Arg Glu Ser Lys Gln
945 950 955 960

aga acc cat ccg cct cac act ttg ata ggc tca cgg gaa tct ctc tct
2928
Arg Thr His Pro Pro His Thr Leu Ile Gly Ser Arg Glu Ser Leu Ser
965 970 975

cct cat ttc gcg cct aaa tgg aaa cat gtt ctc cgt ctg tca gat att
2976
Pro His Phe Ala Pro Lys Trp Lys His Val Leu Arg Leu Ser Asp Ile
980 985 990

cca tgg ata cga gat cac gtc gtt ggt tcg agc atc atc ttt ccg gga
3024
Pro Trp Ile Arg Asp His Val Val Gly Ser Ser Ile Ile Phe Pro Gly
995 1000 1005

gct ggc ttc atc agc atg gcc atc gag ggg ttt tca caa gtc tgc
3069
Ala Gly Phe Ile Ser Met Ala Ile Glu Gly Phe Ser Gln Val Cys
1010 1015 1020

cca cca gtt gcg ggg gct agc atc aac tac aac ttg cgt gac gtt
3114
Pro Pro Val Ala Gly Ala Ser Ile Asn Tyr Asn Leu Arg Asp Val
1025 1030 1035

gaa ctc gcg cag gct ctc ata ata ccc gct gat gca gaa gca gag
3159
Glu Leu Ala Gln Ala Leu Ile Ile Pro Ala Asp Ala Glu Ala Glu

1040	1045	1050
gtt gac 3204	ctg cgc cta acg atc	cgt tca tgt gag gaa agg tcc ctc
Val Asp	Leu Arg Leu Thr Ile	Arg Ser Cys Glu Glu Arg Ser Leu
1055	1060	1065
ggc aca 3249	aag aac tgg cat caa	ttt tct gtg cac tca att tcg ggc
Gly Thr	Lys Asn Trp His Gln	Phe Ser Val His Ser Ile Ser Gly
1070	1075	1080
gaa aat 3294	aat acc tgg aca gaa	cac tgc acc gga tta ata cgt tcg
Glu Asn	Asn Thr Trp Thr Glu	His Cys Thr Gly Leu Ile Arg Ser
1085	1090	1095
gag agc 3339	gaa aga agc cac ctt	gac tgt tca act gtg gaa gcc tca
Glu Ser	Glu Arg Ser His Leu	Asp Cys Ser Thr Val Glu Ala Ser
1100	1105	1110
cgc agg 3384	ttg aat cta ggc tca	gat aac cgg agc att gat ccc aac
Arg Arg	Leu Asn Leu Gly Ser	Asp Asn Arg Ser Ile Asp Pro Asn
1115	1120	1125
gat ctc 3429	tgg gag tcc tta cac	gcg aat ggg ata tgc cac gga ccc
Asp Leu	Trp Glu Ser Leu His	Ala Asn Gly Ile Cys His Gly Pro
1130	1135	1140
att ttt 3474	cag aac att cag cga	att caa aac aat gga cag ggc tcg
Ile Phe	Gln Asn Ile Gln Arg	Ile Gln Asn Asn Gly Gln Gly Ser

1145	1150	1155
ttt tgc aga ttt tcc att gct gac act gcc tcg gct atg cct cac 3519		
Phe Cys Arg Phe Ser Ile Ala Asp Thr Ala Ser Ala Met Pro His		
1160	1165	1170
tcg tac gag aat cga cac atc gtc cat cct act act ctg gac tcg 3564		
Ser Tyr Glu Asn Arg His Ile Val His Pro Thr Thr Leu Asp Ser		
1175	1180	1185
gtg atc cag gcg gca tac acg gtg tta ccc tac gcg gga aca cgt 3609		
Val Ile Gln Ala Ala Tyr Thr Val Leu Pro Tyr Ala Gly Thr Arg		
1190	1195	1200
atg aaa acg gcc atg gta cca agg agg cta aga aat gtc aaa ata 3654		
Met Lys Thr Ala Met Val Pro Arg Arg Leu Arg Asn Val Lys Ile		
1205	1210	1215
tcc tct agc ctg gct gac ttg gag gct ggt gat gct ctg gac gca 3699		
Ser Ser Ser Leu Ala Asp Leu Glu Ala Gly Asp Ala Leu Asp Ala		
1220	1225	1230
cag gcc agc atc aag gat cgc aac tct caa tcc ttc tct acc gac 3744		
Gln Ala Ser Ile Lys Asp Arg Asn Ser Gln Ser Phe Ser Thr Asp		
1235	1240	1245
ttg gca gtg ttt gat gac tat gat agc ggt tct tct ccc tcg gac 3789		
Leu Ala Val Phe Asp Asp Tyr Asp Ser Gly Ser Ser Pro Ser Asp		
1250	1255	1260

gga atc cca gtc ata gag att gaa ggc ctt gtt ttc cag tcg gtt
 3834
 Gly Ile Pro Val Ile Glu Ile Glu Gly Leu Val Phe Gln Ser Val

1265

1270

1275

gga agc agc ttc tct gac caa aag tca gac tcc aac gac aca gaa
 3879
 Gly Ser Ser Phe Ser Asp Gln Lys Ser Asp Ser Asn Asp Thr Glu

1280

1285

1290

aat gcc tgc agc tcc tgg gtt tgg gcc cct gac atc agc ttg ggt
 3924
 Asn Ala Cys Ser Ser Trp Val Trp Ala Pro Asp Ile Ser Leu Gly

1295

1300

1305

gac tcc act tgg ctc aaa gaa aag ttg agc act gag gct gag acg
 3969
 Asp Ser Thr Trp Leu Lys Glu Lys Leu Ser Thr Glu Ala Glu Thr

1310

1315

1320

aaa gaa acg gaa ctc atg atg gac ctc cga aga tgc acg atc aac
 4014
 Lys Glu Thr Glu Leu Met Met Asp Leu Arg Arg Cys Thr Ile Asn

1325

1330

1335

ttt ata cag gag gct gtc act gat ttg aca aat tct gat atc caa
 4059
 Phe Ile Gln Glu Ala Val Thr Asp Leu Thr Asn Ser Asp Ile Gln

1340

1345

1350

cat ctg gat ggc cac ctt cag aag tat ttc gat tgg atg aat gtc
 4104
 His Leu Asp Gly His Leu Gln Lys Tyr Phe Asp Trp Met Asn Val

1355

1360

1365

caa ttg gac ctt gcg aga caa aac aag ctc agc cca gcc agt tgc
 4149
 Gln Leu Asp Leu Ala Arg Gln Asn Lys Leu Ser Pro Ala Ser Cys
 1370 1375 1380

gac tgg cta agt gac gat gct gag cag aag aaa tgc cta cag gcc
 4194
 Asp Trp Leu Ser Asp Asp Ala Glu Gln Lys Lys Cys Leu Gln Ala
 1385 1390 1395

aga gtc gct gga gaa agc gtc aat ggc gag atg att tct cgt cta
 4239
 Arg Val Ala Gly Glu Ser Val Asn Gly Glu Met Ile Ser Arg Leu
 1400 1405 1410

gga cct cag tta ata gca atg cta cgc cgc gaa aca gag cca ctt
 4284
 Gly Pro Gln Leu Ile Ala Met Leu Arg Arg Glu Thr Glu Pro Leu
 1415 1420 1425

gag ttg atg atg caa gat cag ctg cta agc aga tac tac gtc aac
 4329
 Glu Leu Met Met Gln Asp Gln Leu Leu Ser Arg Tyr Tyr Val Asn
 1430 1435 1440

gca atc aaa tgg agc cga tca aac gca caa gcc agc gag ctg atc
 4374
 Ala Ile Lys Trp Ser Arg Ser Asn Ala Gln Ala Ser Glu Leu Ile
 1445 1450 1455

cga ctt tgc gcc cac aag aac ccg cgt tct cgc att ttg gag att
 4419
 Arg Leu Cys Ala His Lys Asn Pro Arg Ser Arg Ile Leu Glu Ile
 1460 1465 1470

ggc gga ggc acg ggc ggc tgc aca aag ctt att gtc aat gca ttg

4464
 Gly Gly Gly Thr Gly Gly Cys Thr Lys Leu Ile Val Asn Ala Leu
 1475 1480 1485

gga aac acc aag ccg atc gat cgt tat gac ttc acc gat gtg tct
 4509
 Gly Asn Thr Lys Pro Ile Asp Arg Tyr Asp Phe Thr Asp Val Ser
 1490 1495 1500

gcc ggg ttt ttc gag tcg gcg cgt gag caa ttt gcg gat tgg caa
 4554
 Ala Gly Phe Phe Glu Ser Ala Arg Glu Gln Phe Ala Asp Trp Gln
 1505 1510 1515

gac gtg atg act ttc aaa aaa ttg gat att gaa agc gat ccc gag
 4599
 Asp Val Met Thr Phe Lys Lys Leu Asp Ile Glu Ser Asp Pro Glu
 1520 1525 1530

caa caa ggg ttt gaa tgt gcc acc tac gat gtg gtc gtg gct tgc
 4644
 Gln Gln Gly Phe Glu Cys Ala Thr Tyr Asp Val Val Val Ala Cys
 1535 1540 1545

cag gtc ctg cat gca act cga tgc atg aaa cga aca ctg agt aac
 4689
 Gln Val Leu His Ala Thr Arg Cys Met Lys Arg Thr Leu Ser Asn
 1550 1555 1560

gtt cga aaa ttg ctc aag cct ggg ggc aac ttg att ttg gtt gag
 4734
 Val Arg Lys Leu Leu Lys Pro Gly Gly Asn Leu Ile Leu Val Glu
 1565 1570 1575

act acc agg gat cag ctc gat ttg ttc ttt acc ttc gga ctg ttg
 4779

Thr Thr	Arg Asp Gln Leu Asp	Leu Phe Phe Thr Phe	Gly Leu Leu
1580	1585	1590	

cca ggt 4824	tgg tgg ctc agt gag	gag cct gag cgg aag	tcg acg cca
Pro Gly	Trp Trp Leu Ser Glu	Glu Pro Glu Arg Lys	Ser Thr Pro
1595	1600	1605	

tcg ctc 4869	act acc gat ctt tgg	aac acc atg ttg gac	acg agc ggt
Ser Leu	Thr Thr Asp Leu Trp	Asn Thr Met Leu Asp	Thr Ser Gly
1610	1615	1620	

ttc aac 4914	ggg gtg gaa ttg gag	gtt cgt gat tgt gaa	gac gat gag
Phe Asn	Gly Val Glu Leu Glu	Val Arg Asp Cys Glu	Asp Asp Glu
1625	1630	1635	

ttt tac 4959	atg atc agc aca atg	cta tcg acg gct aga	aaa gag aat
Phe Tyr	Met Ile Ser Thr Met	Leu Ser Thr Ala Arg	Lys Glu Asn
1640	1645	1650	

aca acc 5004	ccg gat aca gtg gca	gaa tcg gag gtg ctt	ttg ctg cac
Thr Thr	Pro Asp Thr Val Ala	Glu Ser Glu Val Leu	Leu Leu His
1655	1660	1665	

gga gcg 5049	ctc cga cct cct tca	tct tgg ctg gaa agt	ctc cag gca
Gly Ala	Leu Arg Pro Pro Ser	Ser Trp Leu Glu Ser	Leu Gln Ala
1670	1675	1680	

gca att 5094	tgt gaa aag acc agt	tct agc cca tcg atc	aac gct ctg
Ala Ile	Cys Glu Lys Thr Ser	Ser Ser Pro Ser Ile	Asn Ala Leu

1685	1690	1695
ggc gag gta gat acc act gga agg aca tgc att ttt ctt ggg gaa 5139		
Gly Glu Val Asp Thr Thr Gly Arg Thr Cys Ile Phe Leu Gly Glu		
1700	1705	1710
atg gag tcc tcg ctc ctt gga gag gtg gga agc gag acc ttc aaa 5184		
Met Glu Ser Ser Leu Leu Gly Glu Val Gly Ser Glu Thr Phe Lys		
1715	1720	1725
tcc atc acc gcg atg ctg aat aac tgc aac gca ctt ctc tgg gtg 5229		
Ser Ile Thr Ala Met Leu Asn Asn Cys Asn Ala Leu Leu Trp Val		
1730	1735	1740
tct aga gga gca gcc atg agc tcc gag gat cca tgg aaa gct cta 5274		
Ser Arg Gly Ala Ala Met Ser Ser Glu Asp Pro Trp Lys Ala Leu		
1745	1750	1755
cat att ggt ctg ctg cgt acc atc cgc aac gaa aat aac ggg aag 5319		
His Ile Gly Leu Leu Arg Thr Ile Arg Asn Glu Asn Asn Gly Lys		
1760	1765	1770
gaa tat gta tcg ttg gat ctc gat cct tct cga aac gca tac acc 5364		
Glu Tyr Val Ser Leu Asp Leu Asp Pro Ser Arg Asn Ala Tyr Thr		
1775	1780	1785
cac gag tcc ctg tat gct atc tgc aat atc ttc aat ggc cgc ctc 5409		
His Glu Ser Leu Tyr Ala Ile Cys Asn Ile Phe Asn Gly Arg Leu		

1790	1795	1800
ggc gac ctt tcc gaa gac aag 5454	gag ttt gaa ttt gca	gag aga aac
Gly Asp Leu Ser Glu Asp Lys	Glu Phe Glu Phe Ala	Glu Arg Asn
1805	1810	1815
ggc gtc atc cac gta ccg cga 5499	ctt ttc aat gac ccg	cac tgg aag
Gly Val Ile His Val Pro Arg	Leu Phe Asn Asp Pro	His Trp Lys
1820	1825	1830
gac caa gaa gcg gtt gag gtc 5544	aca ctg cag ccg ttc	gag caa ccc
Asp Gln Glu Ala Val Glu Val	Thr Leu Gln Pro Phe	Glu Gln Pro
1835	1840	1845
ggg cgt cgt ctg cgg atg gag 5589	gtt gag acg cca ggg	ctc tta gac
Gly Arg Arg Leu Arg Met Glu	Val Glu Thr Pro Gly	Leu Leu Asp
1850	1855	1860
tcc ctg caa ttt cga gac gac 5634	gaa gga cgt gaa ggc	aag gat ctt
Ser Leu Gln Phe Arg Asp Asp	Glu Gly Arg Glu Gly	Lys Asp Leu
1865	1870	1875
ccg gat gat tgg gta gaa atc 5679	gaa ccc aaa gct ttc	ggg ctc aat
Pro Asp Asp Trp Val Glu Ile	Glu Pro Lys Ala Phe	Gly Leu Asn
1880	1885	1890
ttt cgg gat gtc atg gtt gcc 5724	atg ggt caa ttg gag	gcc aac cgt
Phe Arg Asp Val Met Val Ala	Met Gly Gln Leu Glu	Ala Asn Arg
1895	1900	1905

gtg atg ggc ttc gaa tgc gcc gga gtg atc aca aag ctc ggt gga
 5769
 Val Met Gly Phe Glu Cys Ala Gly Val Ile Thr Lys Leu Gly Gly

1910

1915

1920

gct gct gcc gct agc caa ggc ctc aga tta ggg gac cgc gta tgt
 5814
 Ala Ala Ala Ala Ser Gln Gly Leu Arg Leu Gly Asp Arg Val Cys

1925

1930

1935

gca cta ctg aaa ggc cat tgg gcg acc aga aca cag acg ccg tac
 5859
 Ala Leu Leu Lys Gly His Trp Ala Thr Arg Thr Gln Thr Pro Tyr

1940

1945

1950

act aat gtc gtc cgt att ccg gac gaa atg ggc ttc cca gaa gcc
 5904
 Thr Asn Val Val Arg Ile Pro Asp Glu Met Gly Phe Pro Glu Ala

1955

1960

1965

gct tcg gtc ccc ctg gct ttc act acc gca tat att gcg ctt tat
 5949
 Ala Ser Val Pro Leu Ala Phe Thr Thr Ala Tyr Ile Ala Leu Tyr

1970

1975

1980

acc acg gca aag cta cga cga ggc gaa aga gtc ttg atc cac agt
 5994
 Thr Thr Ala Lys Leu Arg Arg Gly Glu Arg Val Leu Ile His Ser

1985

1990

1995

gga gct gga ggc gtc ggt caa gca gcg atc att ttg tcc cag ctt
 6039
 Gly Ala Gly Gly Val Gly Gln Ala Ala Ile Ile Leu Ser Gln Leu

2000

2005

2010

gcg ggt gcc gag gtc ttc gtc aca gcg gga act caa gcc aag cgt
6084
Ala Gly Ala Glu Val Phe Val Thr Ala Gly Thr Gln Ala Lys Arg

2015

2020

2025

gac ttt gtc ggc gat aaa ttc ggc atc aat ccg gat cat atc ttc
6129
Asp Phe Val Gly Asp Lys Phe Gly Ile Asn Pro Asp His Ile Phe

2030

2035

2040

tcg agc agg aat gac tta ttc gtc gac ggc atc aaa gcc tac acg
6174
Ser Ser Arg Asn Asp Leu Phe Val Asp Gly Ile Lys Ala Tyr Thr

2045

2050

2055

ggc gga ctt ggc gtt cat gtc gtt cta aac tca ttg gca ggt caa
6219
Gly Gly Leu Gly Val His Val Val Leu Asn Ser Leu Ala Gly Gln

2060

2065

2070

ctc ctc caa gca agc ttt gac tgc atg gcc gaa ttc ggc aga ttt
6264
Leu Leu Gln Ala Ser Phe Asp Cys Met Ala Glu Phe Gly Arg Phe

2075

2080

2085

gtt gag att gga aaa aag gac ctg gag caa aac agc aga ctt gac
6309
Val Glu Ile Gly Lys Lys Asp Leu Glu Gln Asn Ser Arg Leu Asp

2090

2095

2100

atg ctg cca ttc acc cgg gac gtc tct ttc aca tca att gat ctt
6354
Met Leu Pro Phe Thr Arg Asp Val Ser Phe Thr Ser Ile Asp Leu

2105

2110

2115

ctc tcg tgg caa aga gcc aaa agt gaa gaa gta tcc gaa gcg ttg

6399
 Leu Ser Trp Gln Arg Ala Lys Ser Glu Glu Val Ser Glu Ala Leu
 2120 2125 2130

aac cat gtc aca aaa ctc ctc gag aca aaa gcg att ggc ttg att
 6444
 Asn His Val Thr Lys Leu Leu Glu Thr Lys Ala Ile Gly Leu Ile
 2135 2140 2145

ggt cca atc cag cag cac tcc ttg tca aac atc gag aag gcc ttc
 6489
 Gly Pro Ile Gln Gln His Ser Leu Ser Asn Ile Glu Lys Ala Phe
 2150 2155 2160

cgt acg atg cag agt ggt cag cat gtt ggc aaa gtt gtg gtc aat
 6534
 Arg Thr Met Gln Ser Gly Gln His Val Gly Lys Val Val Val Asn
 2165 2170 2175

gta tct ggg gac gaa ctg gtc cca gtc ggc gat gga ggg ttc tcg
 6579
 Val Ser Gly Asp Glu Leu Val Pro Val Gly Asp Gly Gly Phe Ser
 2180 2185 2190

ctg aag ctg aag cct gac agt tct tac cta gtt gct ggt ggg ctg
 6624
 Leu Lys Leu Lys Pro Asp Ser Ser Tyr Leu Val Ala Gly Gly Leu
 2195 2200 2205

ggg gga att gga aag cag atc tgt cag tgg ctt gtt gat cat ggc
 6669
 Gly Gly Ile Gly Lys Gln Ile Cys Gln Trp Leu Val Asp His Gly
 2210 2215 2220

gcg aag cac ttg att atc cta tcg aga agt gca aag gcc agt cca
 6714

Ala	Lys	His	Leu	Ile	Ile	Leu	Ser	Arg	Ser	Ala	Lys	Ala	Ser	Pro
2225						2230					2235			
ttc	ata	acc	agc	ttg	caa	aat	caa	cag	tgc	gct	gtc	tat	cta	cac
6759														
Phe	Ile	Thr	Ser	Leu	Gln	Asn	Gln	Gln	Cys	Ala	Val	Tyr	Leu	His
2240						2245					2250			
gca	tgt	gac	atc	tca	gat	caa	gat	cag	gtc	acc	aag	gtg	ctc	cgg
6804														
Ala	Cys	Asp	Ile	Ser	Asp	Gln	Asp	Gln	Val	Thr	Lys	Val	Leu	Arg
2255						2260					2265			
ttg	tgc	gaa	gaa	gca	cat	gca	ccg	cca	att	cga	ggc	atc	ata	caa
6849														
Leu	Cys	Glu	Glu	Ala	His	Ala	Pro	Pro	Ile	Arg	Gly	Ile	Ile	Gln
2270						2275					2280			
ggc	gcc	atg	gtt	ctc	aag	gac	gcg	ctt	cta	tcg	cga	atg	aca	ttg
6894														
Gly	Ala	Met	Val	Leu	Lys	Asp	Ala	Leu	Leu	Ser	Arg	Met	Thr	Leu
2285						2290					2295			
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6939														
Asp	Glu	Phe	Asn	Ala	Ala	Thr	Arg	Pro	Lys	Val	Gln	Gly	Ser	Trp
2300						2305					2310			
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6984														
Tyr	Leu	His	Lys	Ile	Ala	Gln	Asp	Val	Asp	Phe	Phe	Val	Met	Leu
2315						2320					2325			
tca	tcc	ctt	gtt	ggg	gtc	atg	ggc	ggg	gca	ggc	cag	gcc	aat	tac
7029														
Ser	Ser	Leu	Val	Gly	Val	Met	Gly	Gly	Ala	Gly	Gln	Ala	Asn	Tyr

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Ala Ala Ala Gly Ala Phe Gln Asp Ala Leu Ala His His Arg Arg		
2345	2350	2355
gcc cat ggc atg ccg gct gtc acc att gac ttg ggc atg gtc aag 7119		
Ala His Gly Met Pro Ala Val Thr Ile Asp Leu Gly Met Val Lys		
2360	2365	2370
tct gtt gga tac gtg gct gaa act ggc cgt ggt gtg gcc gac cgg 7164		
Ser Val Gly Tyr Val Ala Glu Thr Gly Arg Gly Val Ala Asp Arg		
2375	2380	2385
ctc gct aga ata ggt tac aag cct atg cat gaa aag gac gtc atg 7209		
Leu Ala Arg Ile Gly Tyr Lys Pro Met His Glu Lys Asp Val Met		
2390	2395	2400
gat gtg ttg gag aag gca atc ctg tgt tct tcc cct caa ttt cca 7254		
Asp Val Leu Glu Lys Ala Ile Leu Cys Ser Ser Pro Gln Phe Pro		
2405	2410	2415
tca cct ccc gca gct gtg gtt aca gga atc aac aca tcc ccg ggt 7299		
Ser Pro Pro Ala Ala Val Val Thr Gly Ile Asn Thr Ser Pro Gly		
2420	2425	2430
gct cac tgg acc gag gca aac tgg ata cag gaa cag cgg ttt gtg 7344		
Ala His Trp Thr Glu Ala Asn Trp Ile Gln Glu Gln Arg Phe Val		

2435	2440	2445
gga ctt 7389	aaa tac cgc caa gtc	ctt cat gca gac caa tcc ttt gtc
Gly Leu	Lys Tyr Arg Gln Val	Leu His Ala Asp Gln Ser Phe Val
2450	2455	2460
tct tcg 7434	cat aaa aaa gga cca	gat ggc gtg cgg gcc caa cta agc
Ser Ser	His Lys Lys Gly Pro	Asp Gly Val Arg Ala Gln Leu Ser
2465	2470	2475
agg gtc 7479	acc tct cac gac gag	gcc att tct atc gtc ctc aaa gca
Arg Val	Thr Ser His Asp Glu	Ala Ile Ser Ile Val Leu Lys Ala
2480	2485	2490
atg acg 7524	gaa aag ctg atg cga	atg ttt ggt ctg gca gaa gac gac
Met Thr	Glu Lys Leu Met Arg	Met Phe Gly Leu Ala Glu Asp Asp
2495	2500	2505
atg tcc 7569	tcg tcc aaa aac ctg	gca ggt gtc ggc gta gac tca ctc
Met Ser	Ser Ser Lys Asn Leu	Ala Gly Val Gly Val Asp Ser Leu
2510	2515	2520
gtc gcc 7614	att gaa ctt cga aac	tgg atc aca tct gaa atc cat gtt
Val Ala	Ile Glu Leu Arg Asn	Trp Ile Thr Ser Glu Ile His Val
2525	2530	2535
gat gtg 7659	tcg atc ttt gag ctc	atg aat ggt aac acc atc gcc ggc
Asp Val	Ser Ile Phe Glu Leu	Met Asn Gly Asn Thr Ile Ala Gly
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ctc gtc gag tta gtt gtg gcg aaa tgc agt taa
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2555

2560

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<211> 2563

<212> PRT

<213> Penicillium citrinum

<400> 46

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Ala Thr Ala Met Ala Gly Ser Ala Cys Ser Asn Thr Ser Thr Pro Ile
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Ala Ile Val Gly Met Gly Cys Arg Phe Ala Gly Asp Ala Thr Ser Pro
35 40 45

Gln Lys Leu Trp Glu Met Val Glu Arg Gly Gly Ser Ala Trp Ser Lys
50 55 60

Val Pro Ser Ser Arg Phe Asn Val Arg Gly Val Tyr His Pro Asn Gly
65 70 75 80

Glu Arg Val Gly Ser Thr His Val Lys Gly Gly His Phe Ile Asp Glu
85 90 95

Asp Pro Ala Leu Phe Asp Ala Ala Phe Phe Asn Met Thr Thr Glu Val
100 105 110

Ala	Ser	Cys	Met	Asp	Pro	Gln	Tyr	Arg	Leu	Met	Leu	Glu	Val	Val	Tyr	115	120	125
Glu	Ser	Leu	Glu	Ser	Ala	Gly	Ile	Thr	Ile	Asp	Gly	Met	Ala	Gly	Ser	130	135	140
Asn	Thr	Ser	Val	Phe	Gly	Gly	Val	Met	Tyr	His	Asp	Tyr	Gln	Asp	Ser	145	150	155
Leu	Asn	Arg	Asp	Pro	Glu	Thr	Val	Pro	Arg	Tyr	Phe	Ile	Thr	Gly	Asn	165	170	175
Ser	Gly	Thr	Met	Leu	Ser	Asn	Arg	Ile	Ser	His	Phe	Tyr	Asp	Leu	Arg	180	185	190
Gly	Pro	Ser	Val	Thr	Val	Asp	Thr	Ala	Cys	Ser	Thr	Thr	Leu	Thr	Ala	195	200	205
Leu	His	Leu	Ala	Cys	Gln	Ser	Leu	Arg	Thr	Gly	Glu	Ser	Asp	Thr	Ala	210	215	220
Ile	Val	Ile	Gly	Ala	Asn	Leu	Leu	Leu	Asn	Pro	Asp	Val	Phe	Val	Thr	225	230	235
Met	Ser	Asn	Leu	Gly	Phe	Leu	Ser	Pro	Asp	Gly	Ile	Ser	Tyr	Ser	Phe	245	250	255
Asp	Pro	Arg	Ala	Asn	Gly	Tyr	Gly	Arg	Gly	Glu	Gly	Ile	Ala	Ala	Leu	260	265	270
Val	Ile	Lys	Ala	Leu	Pro	Asn	Ala	Leu	Arg	Asp	Gln	Asp	Pro	Ile	Arg	275	280	285
Ala	Val	Ile	Arg	Glu	Thr	Ala	Leu	Asn	Gln	Asp	Gly	Lys	Thr	Pro	Ala	290	295	300
Ile	Thr	Ala	Pro	Ser	Asp	Val	Ala	Gln	Lys	Ser	Leu	Ile	Gln	Glu	Cys	305	310	315
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Tyr	Asp	Lys	Ala	Gly	Leu	Asp	Met	Ser	Leu	Thr	Ser	Tyr	Val	Glu	Ala
				325					330					335	
His	Gly	Thr	Gly	Thr	Pro	Thr	Gly	Asp	Pro	Leu	Glu	Ile	Ser	Ala	Ile
			340					345					350		
Ser	Ala	Ala	Phe	Lys	Gly	His	Pro	Leu	His	Leu	Gly	Ser	Val	Lys	Ala
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Asn	Ile	Gly	His	Thr	Glu	Ala	Ala	Ser	Gly	Leu	Ala	Ser	Ile	Ile	Lys
	370					375					380				
Val	Ala	Leu	Ala	Leu	Glu	Lys	Gly	Leu	Ile	Pro	Pro	Asn	Ala	Arg	Phe
385					390					395					400
Leu	Gln	Lys	Asn	Ser	Lys	Leu	Met	Leu	Asp	Gln	Lys	Asn	Ile	Lys	Ile
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Pro	Met	Ser	Ala	Gln	Asp	Trp	Pro	Val	Lys	Asp	Gly	Thr	Arg	Arg	Ala
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Ser	Val	Asn	Asn	Phe	Gly	Phe	Gly	Gly	Ser	Asn	Ala	His	Val	Ile	Leu
		435					440					445			
Glu	Ser	Tyr	Asp	Arg	Ala	Ser	Leu	Ala	Leu	Pro	Glu	Asp	Gln	Val	His
	450					455					460				
Val	Asn	Gly	Asn	Ser	Glu	His	Gly	Arg	Val	Glu	Asp	Gly	Ser	Lys	Gln
465					470					475					480
Ser	Arg	Ile	Tyr	Val	Val	Arg	Ala	Lys	Asp	Glu	Gln	Ala	Cys	Arg	Arg
				485					490					495	
Thr	Ile	Ala	Ser	Leu	Arg	Asp	Tyr	Ile	Lys	Ser	Val	Ala	Asp	Ile	Asp
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Gly	Glu	Pro	Phe	Leu	Ala	Ser	Leu	Ala	Tyr	Thr	Leu	Gly	Ser	Arg	Arg

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Ser	Ile	Leu	Pro	Trp	Thr	Ser	Val	Tyr	Val	Ala	Asp	Ser	Leu	Gly	Gly
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Leu	Val	Ser	Ala	Leu	Ser	Asp	Glu	Ser	Asn	Gln	Pro	Lys	Arg	Ala	Asn
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Glu	Lys	Val	Arg	Leu	Gly	Phe	Val	Phe	Thr	Gly	Gln	Gly	Ala	Gln	Trp
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His	Ala	Met	Gly	Arg	Glu	Leu	Val	Asn	Thr	Phe	Pro	Val	Phe	Lys	Gln
			580					585					590		
Ala	Ile	Leu	Glu	Cys	Asp	Gly	Tyr	Ile	Lys	Gln	Leu	Gly	Ala	Ser	Trp
		595					600					605			
Asn	Phe	Met	Glu	Glu	Leu	His	Arg	Asp	Glu	Leu	Thr	Thr	Arg	Val	Asn
	610					615					620				
Asp	Ala	Glu	Tyr	Ser	Leu	Pro	Leu	Ser	Thr	Ala	Ile	Gln	Ile	Ala	Leu
625					630					635					640
Val	Arg	Leu	Leu	Trp	Ser	Trp	Gly	Ile	Arg	Pro	Thr	Gly	Ile	Thr	Ser
				645					650					655	
His	Ser	Ser	Gly	Glu	Ala	Ala	Ala	Ala	Tyr	Ala	Ala	Gly	Ala	Leu	Ser
			660					665					670		
Ala	Arg	Ser	Ala	Ile	Gly	Ile	Thr	Tyr	Ile	Arg	Gly	Val	Leu	Thr	Thr
		675					680					685			
Lys	Pro	Lys	Pro	Ala	Leu	Ala	Ala	Lys	Gly	Gly	Met	Met	Ala	Val	Gly
	690					695					700				
Leu	Gly	Arg	Ser	Glu	Thr	Asn	Val	Tyr	Ile	Ser	Arg	Leu	Asn	Gln	Glu
705					710					715					720

Asp	Gly	Cys	Val	Val	Val	Gly	Cys	Ile	Asn	Ser	Gln	Cys	Ser	Val	Thr	
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Val	Ser	Gly	Asp	Leu	Gly	Ala	Ile	Glu	Lys	Leu	Glu	Lys	Leu	Leu	His	
			740					745					750			
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		755					760					765				
Ser	Ser	His	Met	Arg	Pro	Met	Ala	Asp	Ala	Phe	Gly	Ala	Ser	Leu	Arg	
	770					775					780					
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785					790					795					800	
Ser	Lys	Gly	Val	Leu	Tyr	Ser	Ser	Pro	Lys	Thr	Gly	Ser	Arg	Met	Thr	
				805					810					815		
Asp	Leu	Lys	Leu	Leu	Leu	Asp	Pro	Thr	His	Trp	Met	Asp	Ser	Met	Leu	
			820					825					830			
Gln	Pro	Val	Glu	Phe	Glu	Ser	Ser	Leu	Arg	Glu	Met	Cys	Phe	Asp	Pro	
		835					840					845				
Asn	Thr	Lys	Glu	Lys	Ala	Val	Asp	Val	Ile	Ile	Glu	Ile	Gly	Pro	His	
	850					855					860					
Gly	Ala	Leu	Gly	Gly	Pro	Ile	Asn	Gln	Val	Met	Gln	Asp	Leu	Gly	Leu	
865					870					875					880	
Lys	Gly	Thr	Asp	Ile	Asn	Tyr	Leu	Ser	Cys	Leu	Ser	Arg	Gly	Arg	Ser	
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		915					920					925				

Pro Arg Val Lys Val Leu Ser Asp Leu Pro Ala Tyr Pro Trp Asn His
930 935 940

Gln Thr Arg Tyr Trp Arg Glu Pro Arg Gly Ser Arg Glu Ser Lys Gln
945 950 955 960

Arg Thr His Pro Pro His Thr Leu Ile Gly Ser Arg Glu Ser Leu Ser
965 970 975

Pro His Phe Ala Pro Lys Trp Lys His Val Leu Arg Leu Ser Asp Ile
980 985 990

Pro Trp Ile Arg Asp His Val Val Gly Ser Ser Ile Ile Phe Pro Gly
995 1000 1005

Ala Gly Phe Ile Ser Met Ala Ile Glu Gly Phe Ser Gln Val Cys
1010 1015 1020

Pro Pro Val Ala Gly Ala Ser Ile Asn Tyr Asn Leu Arg Asp Val
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Glu Leu Ala Gln Ala Leu Ile Ile Pro Ala Asp Ala Glu Ala Glu
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Val Asp Leu Arg Leu Thr Ile Arg Ser Cys Glu Glu Arg Ser Leu
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Gly Thr Lys Asn Trp His Gln Phe Ser Val His Ser Ile Ser Gly
1070 1075 1080

Glu Asn Asn Thr Trp Thr Glu His Cys Thr Gly Leu Ile Arg Ser
1085 1090 1095

Glu Ser Glu Arg Ser His Leu Asp Cys Ser Thr Val Glu Ala Ser
1100 1105 1110

Arg Arg Leu Asn Leu Gly Ser Asp Asn Arg Ser Ile Asp Pro Asn

1115					1120					1125				
Asp	Leu	Trp	Glu	Ser	Leu	His	Ala	Asn	Gly	Ile	Cys	His	Gly	Pro
1130						1135					1140			
Ile	Phe	Gln	Asn	Ile	Gln	Arg	Ile	Gln	Asn	Asn	Gly	Gln	Gly	Ser
1145						1150					1155			
Phe	Cys	Arg	Phe	Ser	Ile	Ala	Asp	Thr	Ala	Ser	Ala	Met	Pro	His
1160						1165					1170			
Ser	Tyr	Glu	Asn	Arg	His	Ile	Val	His	Pro	Thr	Thr	Leu	Asp	Ser
1175						1180					1185			
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1190						1195					1200			
Met	Lys	Thr	Ala	Met	Val	Pro	Arg	Arg	Leu	Arg	Asn	Val	Lys	Ile
1205						1210					1215			
Ser	Ser	Ser	Leu	Ala	Asp	Leu	Glu	Ala	Gly	Asp	Ala	Leu	Asp	Ala
1220						1225					1230			
Gln	Ala	Ser	Ile	Lys	Asp	Arg	Asn	Ser	Gln	Ser	Phe	Ser	Thr	Asp
1235						1240					1245			
Leu	Ala	Val	Phe	Asp	Asp	Tyr	Asp	Ser	Gly	Ser	Ser	Pro	Ser	Asp
1250						1255					1260			
Gly	Ile	Pro	Val	Ile	Glu	Ile	Glu	Gly	Leu	Val	Phe	Gln	Ser	Val
1265						1270					1275			
Gly	Ser	Ser	Phe	Ser	Asp	Gln	Lys	Ser	Asp	Ser	Asn	Asp	Thr	Glu
1280						1285					1290			
Asn	Ala	Cys	Ser	Ser	Trp	Val	Trp	Ala	Pro	Asp	Ile	Ser	Leu	Gly
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His	Leu	Asp	Gly	His	Leu	Gln	Lys	Tyr	Phe	Asp	Trp	Met	Asn	Val
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1370						1375					1380			
Asp	Trp	Leu	Ser	Asp	Asp	Ala	Glu	Gln	Lys	Lys	Cys	Leu	Gln	Ala
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1415						1420					1425			
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Ala	Ile	Lys	Trp	Ser	Arg	Ser	Asn	Ala	Gln	Ala	Ser	Glu	Leu	Ile
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1490						1495					1500			

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Pro	Gly	Trp	Trp	Leu	Ser	Glu	Glu	Pro	Glu	Arg	Lys	Ser	Thr	Pro
	1595					1600					1605			
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Phe	Asn	Gly	Val	Glu	Leu	Glu	Val	Arg	Asp	Cys	Glu	Asp	Asp	Glu
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	1670					1675					1680			
Ala	Ile	Cys	Glu	Lys	Thr	Ser	Ser	Ser	Pro	Ser	Ile	Asn	Ala	Leu

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Gly	Glu	Val	Asp	Thr	Thr	Gly	Arg	Thr	Cys	Ile	Phe	Leu	Gly	Glu
1700						1705					1710			
Met	Glu	Ser	Ser	Leu	Leu	Gly	Glu	Val	Gly	Ser	Glu	Thr	Phe	Lys
1715						1720					1725			
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	2060					2065					2070			

Leu	Leu	Gln	Ala	Ser	Phe	Asp	Cys	Met	Ala	Glu	Phe	Gly	Arg	Phe
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Val	Glu	Ile	Gly	Lys	Lys	Asp	Leu	Glu	Gln	Asn	Ser	Arg	Leu	Asp
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Met	Leu	Pro	Phe	Thr	Arg	Asp	Val	Ser	Phe	Thr	Ser	Ile	Asp	Leu
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Arg	Thr	Met	Gln	Ser	Gly	Gln	His	Val	Gly	Lys	Val	Val	Val	Asn
2165						2170					2175			
Val	Ser	Gly	Asp	Glu	Leu	Val	Pro	Val	Gly	Asp	Gly	Gly	Phe	Ser
2180						2185					2190			
Leu	Lys	Leu	Lys	Pro	Asp	Ser	Ser	Tyr	Leu	Val	Ala	Gly	Gly	Leu
2195						2200					2205			
Gly	Gly	Ile	Gly	Lys	Gln	Ile	Cys	Gln	Trp	Leu	Val	Asp	His	Gly
2210						2215					2220			
Ala	Lys	His	Leu	Ile	Ile	Leu	Ser	Arg	Ser	Ala	Lys	Ala	Ser	Pro
2225						2230					2235			
Phe	Ile	Thr	Ser	Leu	Gln	Asn	Gln	Gln	Cys	Ala	Val	Tyr	Leu	His
2240						2245					2250			
Ala	Cys	Asp	Ile	Ser	Asp	Gln	Asp	Gln	Val	Thr	Lys	Val	Leu	Arg

2255					2260					2265				
Leu	Cys	Glu	Glu	Ala	His	Ala	Pro	Pro	Ile	Arg	Gly	Ile	Ile	Gln
	2270					2275					2280			
Gly	Ala	Met	Val	Leu	Lys	Asp	Ala	Leu	Leu	Ser	Arg	Met	Thr	Leu
	2285					2290					2295			
Asp	Glu	Phe	Asn	Ala	Ala	Thr	Arg	Pro	Lys	Val	Gln	Gly	Ser	Trp
	2300					2305					2310			
Tyr	Leu	His	Lys	Ile	Ala	Gln	Asp	Val	Asp	Phe	Phe	Val	Met	Leu
	2315					2320					2325			
Ser	Ser	Leu	Val	Gly	Val	Met	Gly	Gly	Ala	Gly	Gln	Ala	Asn	Tyr
	2330					2335					2340			
Ala	Ala	Ala	Gly	Ala	Phe	Gln	Asp	Ala	Leu	Ala	His	His	Arg	Arg
	2345					2350					2355			
Ala	His	Gly	Met	Pro	Ala	Val	Thr	Ile	Asp	Leu	Gly	Met	Val	Lys
	2360					2365					2370			
Ser	Val	Gly	Tyr	Val	Ala	Glu	Thr	Gly	Arg	Gly	Val	Ala	Asp	Arg
	2375					2380					2385			
Leu	Ala	Arg	Ile	Gly	Tyr	Lys	Pro	Met	His	Glu	Lys	Asp	Val	Met
	2390					2395					2400			
Asp	Val	Leu	Glu	Lys	Ala	Ile	Leu	Cys	Ser	Ser	Pro	Gln	Phe	Pro
	2405					2410					2415			
Ser	Pro	Pro	Ala	Ala	Val	Val	Thr	Gly	Ile	Asn	Thr	Ser	Pro	Gly
	2420					2425					2430			
Ala	His	Trp	Thr	Glu	Ala	Asn	Trp	Ile	Gln	Glu	Gln	Arg	Phe	Val
	2435					2440					2445			

Gly	Leu	Lys	Tyr	Arg	Gln	Val	Leu	His	Ala	Asp	Gln	Ser	Phe	Val
2450						2455					2460			
Ser	Ser	His	Lys	Lys	Gly	Pro	Asp	Gly	Val	Arg	Ala	Gln	Leu	Ser
2465						2470					2475			
Arg	Val	Thr	Ser	His	Asp	Glu	Ala	Ile	Ser	Ile	Val	Leu	Lys	Ala
2480						2485					2490			
Met	Thr	Glu	Lys	Leu	Met	Arg	Met	Phe	Gly	Leu	Ala	Glu	Asp	Asp
2495						2500					2505			
Met	Ser	Ser	Ser	Lys	Asn	Leu	Ala	Gly	Val	Gly	Val	Asp	Ser	Leu
2510						2515					2520			
Val	Ala	Ile	Glu	Leu	Arg	Asn	Trp	Ile	Thr	Ser	Glu	Ile	His	Val
2525						2530					2535			
Asp	Val	Ser	Ile	Phe	Glu	Leu	Met	Asn	Gly	Asn	Thr	Ile	Ala	Gly
2540						2545					2550			
Leu	Val	Glu	Leu	Val	Val	Ala	Lys	Cys	Ser					
2555						2560								

<210> 47

<211> 1557

<212> DNA

<213> Penicillium citrinum

<220>

<221> CDS

<222> (1) .. (1557)

<400> 47

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48

Met Leu Gly Gln Val Leu Leu Thr Val Glu Ser Tyr Gln Trp Val Ser

1

5

10

15

acc cct caa gcc ctt gtg gcg gtc gca gtg ctt ctt agt ctc atc gcc

96

Thr Pro Gln Ala Leu Val Ala Val Ala Val Leu Leu Ser Leu Ile Ala

20

25

30

tac cgt ttg cgg ggg cgc cag tcc gaa ctg caa gtc tat aat ccc aaa

144

Tyr Arg Leu Arg Gly Arg Gln Ser Glu Leu Gln Val Tyr Asn Pro Lys

35

40

45

aaa tgg tgg gag ttg acg acc atg agg gct agg cag gac ttc gat acg

192

Lys Trp Trp Glu Leu Thr Thr Met Arg Ala Arg Gln Asp Phe Asp Thr

50

55

60

tat ggt ccg agc tgg atc gaa gct tgg ttc tcg aaa aac gac aag ccc

240

Tyr Gly Pro Ser Trp Ile Glu Ala Trp Phe Ser Lys Asn Asp Lys Pro

65

70

75

80

ctg cgc ttc att gtt gat tcc ggc tat tgc acc atc ctc cca tcg tcc

288

Leu Arg Phe Ile Val Asp Ser Gly Tyr Cys Thr Ile Leu Pro Ser Ser

85

90

95

atg gcc gac gag ttt cgg aaa atc aaa gat atg tgc atg tac aag ttt

336

Met Ala Asp Glu Phe Arg Lys Ile Lys Asp Met Cys Met Tyr Lys Phe

100

105

110

ttg gcg gat gac ttt cac tct cat ctc cct gga ttc gac ggg ttc aag
384
Leu Ala Asp Asp Phe His Ser His Leu Pro Gly Phe Asp Gly Phe Lys

115

120

125

gaa atc tgc cag gat gca cat ctt gtc aac aaa gtt gtt ttg aac cag
432
Glu Ile Cys Gln Asp Ala His Leu Val Asn Lys Val Val Leu Asn Gln

130

135

140

tta caa acc caa gcc ccc aag tac aca aag cca ttg gct acc ttg gcc
480
Leu Gln Thr Gln Ala Pro Lys Tyr Thr Lys Pro Leu Ala Thr Leu Ala

145

150

155

160

gac gct act att gcc aag ttg ttc ggt aaa agc gag gag tgg caa acc
528
Asp Ala Thr Ile Ala Lys Leu Phe Gly Lys Ser Glu Glu Trp Gln Thr

165

170

175

gca cct gtc tat tcc aat gga ttg gac ctt gtc aca cga aca gtc aca
576
Ala Pro Val Tyr Ser Asn Gly Leu Asp Leu Val Thr Arg Thr Val Thr

180

185

190

ctc att atg gtc ggc gac aaa atc tgc cac aat gag gag tgg ctg gat
624
Leu Ile Met Val Gly Asp Lys Ile Cys His Asn Glu Glu Trp Leu Asp

195

200

205

att gca aag aac cat gcc gtg agt gtg gcg gta caa gct cgc caa ctt
672
Ile Ala Lys Asn His Ala Val Ser Val Ala Val Gln Ala Arg Gln Leu

210

215

220

cgc gta tgg ccc atg cta ctg cga ccg ctc gct cac tgg ttt caa ccg

720
 Arg Val Trp Pro Met Leu Leu Arg Pro Leu Ala His Trp Phe Gln Pro
 225 230 235 240

 caa gga cgc aaa ttg cgt gac caa gtg cgc cgc gca cga aag atc att
 768
 Gln Gly Arg Lys Leu Arg Asp Gln Val Arg Arg Ala Arg Lys Ile Ile
 245 250 255

 gat cct gag att cag cga cga cgt gct gaa aag gcc gca tgt gta gcg
 816
 Asp Pro Glu Ile Gln Arg Arg Arg Ala Glu Lys Ala Ala Cys Val Ala
 260 265 270

 aag ggc gtg cag ccg ccc cag tac gtc gat acc atg caa tgg ttt gaa
 864
 Lys Gly Val Gln Pro Pro Gln Tyr Val Asp Thr Met Gln Trp Phe Glu
 275 280 285

 gac acc gcc gac ggc cgc tgg tac gat gtg gcg ggt gct cag ctc gct
 912
 Asp Thr Ala Asp Gly Arg Trp Tyr Asp Val Ala Gly Ala Gln Leu Ala
 290 295 300

 atg gat ttc gcc ggc atc tac gcc tcg acg gat ctt ttc gtc ggt gcc
 960
 Met Asp Phe Ala Gly Ile Tyr Ala Ser Thr Asp Leu Phe Val Gly Ala
 305 310 315 320

 ctt gtg gac att gcc agg cac cca gac ctt att cag cct ctc cgc caa
 1008
 Leu Val Asp Ile Ala Arg His Pro Asp Leu Ile Gln Pro Leu Arg Gln
 325 330 335

 gag atc cgc act gta atc gga gaa ggg ggc tgg acg cct gcc tct ctg
 1056

Glu Ile Arg Thr Val Ile Gly Glu Gly Gly Trp Thr Pro Ala Ser Leu
340 345 350

ttc aag ctg aag ctc ctc gac agc tgc atg aaa gag acg cag cga atc
1104
Phe Lys Leu Lys Leu Leu Asp Ser Cys Met Lys Glu Thr Gln Arg Ile
355 360 365

aag ccg gtc gag tgc gcc act atg cgc agt acc gct ctc aga gac atc
1152
Lys Pro Val Glu Cys Ala Thr Met Arg Ser Thr Ala Leu Arg Asp Ile
370 375 380

act cta tcc aat ggc ctc ttc att ccc aag ggc gag ttg gcc gct gtg
1200
Thr Leu Ser Asn Gly Leu Phe Ile Pro Lys Gly Glu Leu Ala Ala Val
385 390 395 400

gct gca gac cgc atg aac aac cct gat gtg tgg gaa aac ccc gaa aat
1248
Ala Ala Asp Arg Met Asn Asn Pro Asp Val Trp Glu Asn Pro Glu Asn
405 410 415

tat gat ccc tac cga ttt atg cgc atg cgc gag gat cca gac aag gcc
1296
Tyr Asp Pro Tyr Arg Phe Met Arg Met Arg Glu Asp Pro Asp Lys Ala
420 425 430

ttc acc gct caa ttg gag aat acc aac ggt gat cac atc ggc ttc ggc
1344
Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly
435 440 445

tgg aac cca cgc gct tgt ccc ggg cgg ttc ttc gcc tcg aag gaa atc
1392
Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile

450 455 460
 aag att ctc ctc gct cat ata ctg att cag tat gat gtg aag cct gta
 1440
 Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val
 465 470 475 480
 cca gga gac gat gac aaa tac tac cgt cac gct ttt agc gtt cgt atg
 1488
 Pro Gly Asp Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met
 485 490 495
 cat cca acc aca aag ctc atg gta cgc cgg cgc aac gag gac atc ccg
 1536
 His Pro Thr Thr Lys Leu Met Val Arg Arg Arg Asn Glu Asp Ile Pro
 500 505 510
 ctc cct cat gac cgg tgc taa
 1557
 Leu Pro His Asp Arg Cys
 515

<210> 48
 <211> 518
 <212> PRT
 <213> Penicillium citrinum

<400> 48
 Met Leu Gly Gln Val Leu Leu Thr Val Glu Ser Tyr Gln Trp Val Ser
 1 5 10 15
 Thr Pro Gln Ala Leu Val Ala Val Ala Val Leu Leu Ser Leu Ile Ala

20					25					30					
Tyr	Arg	Leu	Arg	Gly	Arg	Gln	Ser	Glu	Leu	Gln	Val	Tyr	Asn	Pro	Lys
		35					40					45			
Lys	Trp	Trp	Glu	Leu	Thr	Thr	Met	Arg	Ala	Arg	Gln	Asp	Phe	Asp	Thr
	50					55					60				
Tyr	Gly	Pro	Ser	Trp	Ile	Glu	Ala	Trp	Phe	Ser	Lys	Asn	Asp	Lys	Pro
65					70					75					80
Leu	Arg	Phe	Ile	Val	Asp	Ser	Gly	Tyr	Cys	Thr	Ile	Leu	Pro	Ser	Ser
				85					90					95	
Met	Ala	Asp	Glu	Phe	Arg	Lys	Ile	Lys	Asp	Met	Cys	Met	Tyr	Lys	Phe
			100					105					110		
Leu	Ala	Asp	Asp	Phe	His	Ser	His	Leu	Pro	Gly	Phe	Asp	Gly	Phe	Lys
		115					120					125			
Glu	Ile	Cys	Gln	Asp	Ala	His	Leu	Val	Asn	Lys	Val	Val	Leu	Asn	Gln
	130					135					140				
Leu	Gln	Thr	Gln	Ala	Pro	Lys	Tyr	Thr	Lys	Pro	Leu	Ala	Thr	Leu	Ala
145						150					155				160
Asp	Ala	Thr	Ile	Ala	Lys	Leu	Phe	Gly	Lys	Ser	Glu	Glu	Trp	Gln	Thr
				165					170					175	
Ala	Pro	Val	Tyr	Ser	Asn	Gly	Leu	Asp	Leu	Val	Thr	Arg	Thr	Val	Thr
			180					185					190		
Leu	Ile	Met	Val	Gly	Asp	Lys	Ile	Cys	His	Asn	Glu	Glu	Trp	Leu	Asp
		195					200					205			
Ile	Ala	Lys	Asn	His	Ala	Val	Ser	Val	Ala	Val	Gln	Ala	Arg	Gln	Leu
	210					215					220				

Arg	Val	Trp	Pro	Met	Leu	Leu	Arg	Pro	Leu	Ala	His	Trp	Phe	Gln	Pro	225	230	235	240
Gln	Gly	Arg	Lys	Leu	Arg	Asp	Gln	Val	Arg	Arg	Ala	Arg	Lys	Ile	Ile	245	250	255	
Asp	Pro	Glu	Ile	Gln	Arg	Arg	Arg	Ala	Glu	Lys	Ala	Ala	Cys	Val	Ala	260	265	270	
Lys	Gly	Val	Gln	Pro	Pro	Gln	Tyr	Val	Asp	Thr	Met	Gln	Trp	Phe	Glu	275	280	285	
Asp	Thr	Ala	Asp	Gly	Arg	Trp	Tyr	Asp	Val	Ala	Gly	Ala	Gln	Leu	Ala	290	295	300	
Met	Asp	Phe	Ala	Gly	Ile	Tyr	Ala	Ser	Thr	Asp	Leu	Phe	Val	Gly	Ala	305	310	315	320
Leu	Val	Asp	Ile	Ala	Arg	His	Pro	Asp	Leu	Ile	Gln	Pro	Leu	Arg	Gln	325	330	335	
Glu	Ile	Arg	Thr	Val	Ile	Gly	Glu	Gly	Gly	Trp	Thr	Pro	Ala	Ser	Leu	340	345	350	
Phe	Lys	Leu	Lys	Leu	Leu	Asp	Ser	Cys	Met	Lys	Glu	Thr	Gln	Arg	Ile	355	360	365	
Lys	Pro	Val	Glu	Cys	Ala	Thr	Met	Arg	Ser	Thr	Ala	Leu	Arg	Asp	Ile	370	375	380	
Thr	Leu	Ser	Asn	Gly	Leu	Phe	Ile	Pro	Lys	Gly	Glu	Leu	Ala	Ala	Val	385	390	395	400
Ala	Ala	Asp	Arg	Met	Asn	Asn	Pro	Asp	Val	Trp	Glu	Asn	Pro	Glu	Asn	405	410	415	
Tyr	Asp	Pro	Tyr	Arg	Phe	Met	Arg	Met	Arg	Glu	Asp	Pro	Asp	Lys	Ala	420	425	430	

Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly
 435 440 445

Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile
 450 455 460

Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val
 465 470 475 480

Pro Gly Asp Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met
 485 490 495

His Pro Thr Thr Lys Leu Met Val Arg Arg Arg Asn Glu Asp Ile Pro
 500 505 510

Leu Pro His Asp Arg Cys
 515

<210> 49

<211> 3522

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(3522)

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 48

Met Val Ala Ser Leu Leu Pro Ser Arg Phe Arg Gly Arg Glu Ser Met

1

5

10

15

aat cag cag cac cct cta cgc tcg gga aat cgg gca ttg acc tcc aca
 96
 Asn Gln Gln His Pro Leu Arg Ser Gly Asn Arg Ala Leu Thr Ser Thr

20

25

30

ctc caa ttt cta tcc aaa acg gcg tgt cta cac ccg atc cat acc gtt
 144
 Leu Gln Phe Leu Ser Lys Thr Ala Cys Leu His Pro Ile His Thr Val

35

40

45

tgc acc ata gct att cta gct agt acc aca tac gtt gga cta ctc aaa
 192
 Cys Thr Ile Ala Ile Leu Ala Ser Thr Thr Tyr Val Gly Leu Leu Lys

50

55

60

gac agc ttc ttc cat ggc ccc gca aac gtt gat aaa gca gaa tgg ggc
 240
 Asp Ser Phe Phe His Gly Pro Ala Asn Val Asp Lys Ala Glu Trp Gly

65

70

75

80

tct ttg gtc gaa gga agt cga agc ttg atc acc ggc cca cag aat ggc
 288
 Ser Leu Val Glu Gly Ser Arg Ser Leu Ile Thr Gly Pro Gln Asn Gly

85

90

95

tgg aag tgg cag agc ttc gac ggg gat gca gat gtt ctc gga gat ttc
 336
 Trp Lys Trp Gln Ser Phe Asp Gly Asp Ala Asp Val Leu Gly Asp Phe

100

105

110

aac cat caa gca cta atg acc ttg gta ttc ccg ggg tca tat ggg gtt
 384
 Asn His Gln Ala Leu Met Thr Leu Val Phe Pro Gly Ser Tyr Gly Val

115

120

125

gca tct caa gca gcc tca cca ttc ctt gct ccc ctc cct gtg aac cta

432
 Ala Ser Gln Ala Ala Ser Pro Phe Leu Ala Pro Leu Pro Val Asn Leu
 130 135 140
 tct gtg att gac ctt ccc tca acg tcg agc cct tta acc gcc tat tcg
 480
 Ser Val Ile Asp Leu Pro Ser Thr Ser Ser Pro Leu Thr Ala Tyr Ser
 145 150 155 160
 aaa gat aaa gtt ttc gcc ttc tct gtg gaa tac agc agc gcg ccg gaa
 528
 Lys Asp Lys Val Phe Ala Phe Ser Val Glu Tyr Ser Ser Ala Pro Glu
 165 170 175
 ctc gtg gct gct gtt caa gaa atc ccc aac aac agt gcc gac ctg aaa
 576
 Leu Val Ala Ala Val Gln Glu Ile Pro Asn Asn Ser Ala Asp Leu Lys
 180 185 190
 ttg cag gag acg caa ttg atc gag atg gaa cgc cag atg tgg atc atg
 624
 Leu Gln Glu Thr Gln Leu Ile Glu Met Glu Arg Gln Met Trp Ile Met
 195 200 205
 aag gct gcc agg gct cac aca aaa cgc agc ctt gct caa tgg gtg cac
 672
 Lys Ala Ala Arg Ala His Thr Lys Arg Ser Leu Ala Gln Trp Val His
 210 215 220
 gat acc tgg aca gag tct ctt gat ctt atc aag agc gct caa acg ctc
 720
 Asp Thr Trp Thr Glu Ser Leu Asp Leu Ile Lys Ser Ala Gln Thr Leu
 225 230 235 240
 gac gtg gtt gtc atg gtg cta ggt tat ata tca atg cac ttg act ttc
 768

Asp Val Val Val Met Val Leu Gly Tyr Ile Ser Met His Leu Thr Phe
245 250 255

gtc tca ctc ttc ctc agc atg aaa aaa ttg gga tcg aag gtt tgg ctg
816
Val Ser Leu Phe Leu Ser Met Lys Lys Leu Gly Ser Lys Val Trp Leu
260 265 270

gct aca agc gtc ctt ttg tcg tca aca ttt gcc ttt ctc ctc ggt ctc
864
Ala Thr Ser Val Leu Leu Ser Ser Thr Phe Ala Phe Leu Leu Gly Leu
275 280 285

gac gtg gcc ata aga cta ggg gtt ccg atg agc atg agg ttg cta tcc
912
Asp Val Ala Ile Arg Leu Gly Val Pro Met Ser Met Arg Leu Leu Ser
290 295 300

gaa ggc ctc ccc ttc ttg gtg gtg atc gtt ggc ttt gag aag agc atc
960
Glu Gly Leu Pro Phe Leu Val Val Ile Val Gly Phe Glu Lys Ser Ile
305 310 315 320

act ctg acc agg gct gtt ttg tcc tat gct gtg cag cac cga aag ccc
1008
Thr Leu Thr Arg Ala Val Leu Ser Tyr Ala Val Gln His Arg Lys Pro
325 330 335

cag aag ata cag tct gac cag ggt agc gtg aca gcc att gct gaa agt
1056
Gln Lys Ile Gln Ser Asp Gln Gly Ser Val Thr Ala Ile Ala Glu Ser
340 345 350

acc atc aat tac gcc gta cga agc gcc att cgg gag aag ggt tac aat
1104
Thr Ile Asn Tyr Ala Val Arg Ser Ala Ile Arg Glu Lys Gly Tyr Asn

355	360	365	
atc gtg tgc cac tac gtg gtc gag atc ctg ctc cta gtt atc ggt gct 1152 Ile Val Cys His Tyr Val Val Glu Ile Leu Leu Leu Val Ile Gly Ala			
370	375	380	
gtc tta ggc atc caa ggt ggg cta cag cac ttc tgt gtt cta gct gca 1200 Val Leu Gly Ile Gln Gly Gly Leu Gln His Phe Cys Val Leu Ala Ala			
385	390	395	400
ttg atc ctg ttc ttt gac tgt ctg ctg ctg ttt aca ttc tac act gcg 1248 Leu Ile Leu Phe Phe Asp Cys Leu Leu Leu Phe Thr Phe Tyr Thr Ala			
405	410	415	
att ctg tct atc aag ctc gag gta aac cgc ctc aaa cgt cat atc aac 1296 Ile Leu Ser Ile Lys Leu Glu Val Asn Arg Leu Lys Arg His Ile Asn			
420	425	430	
atg cgg tac gcg ttg gaa gat gag ggt ctc agt cag cgg acg gcg gag 1344 Met Arg Tyr Ala Leu Glu Asp Glu Gly Leu Ser Gln Arg Thr Ala Glu			
435	440	445	
agt gtc gcg acc agc aat gat gcc caa gac agt gca cgt aca tat ctg 1392 Ser Val Ala Thr Ser Asn Asp Ala Gln Asp Ser Ala Arg Thr Tyr Leu			
450	455	460	
ttt ggc aat gat atg aaa ggc agc agt gtt ccg aag ttc aaa ttc tgg 1440 Phe Gly Asn Asp Met Lys Gly Ser Ser Val Pro Lys Phe Lys Phe Trp			

465	470	475	480
atg gtc gtt ggt ttc ctt atc gtc aac ctc gtc aac atc ggc tcc acc			
1488			
Met Val Val Gly Phe Leu Ile Val Asn Leu Val Asn Ile Gly Ser Thr			
	485	490	495
ctt ttc caa gcc tct tct agt gga tcg ttg tcc agt ata tca tct tgg			
1536			
Leu Phe Gln Ala Ser Ser Ser Gly Ser Leu Ser Ser Ile Ser Ser Trp			
	500	505	510
acc gaa agt ctg agc gga tcg gcc att aaa ccc ccg ctt gag ccc ttc			
1584			
Thr Glu Ser Leu Ser Gly Ser Ala Ile Lys Pro Pro Leu Glu Pro Phe			
	515	520	525
aag gta gct gga agt gga cta gat gaa cta ctt ttc cag gca aga ggg			
1632			
Lys Val Ala Gly Ser Gly Leu Asp Glu Leu Leu Phe Gln Ala Arg Gly			
	530	535	540
cgc ggt caa tcg act atg gtc act gtc ctc gcc ccc atc aag tac gaa			
1680			
Arg Gly Gln Ser Thr Met Val Thr Val Leu Ala Pro Ile Lys Tyr Glu			
545	550	555	560
cta gag tat cct tcc att cac cgt ggt acc tcg cag cta cac gag tat			
1728			
Leu Glu Tyr Pro Ser Ile His Arg Gly Thr Ser Gln Leu His Glu Tyr			
	565	570	575
gga gtt ggt gga aaa atg gtc ggt agc ctg ctc acc agc ctg gaa gat			
1776			
Gly Val Gly Gly Lys Met Val Gly Ser Leu Leu Thr Ser Leu Glu Asp			
	580	585	590

ccc gtc ctc tcc aaa tgg gtg ttt gtg gca ctt gcc cta agt gtc gct
1824

Pro Val Leu Ser Lys Trp Val Phe Val Ala Leu Ala Leu Ser Val Ala

595

600

605

ctg aac agc tat ctg ttc aag gcc gcc aga ctg gga atc aaa gat cct
1872

Leu Asn Ser Tyr Leu Phe Lys Ala Ala Arg Leu Gly Ile Lys Asp Pro

610

615

620

aat ctc ccg agt cac cca gtt gat cca gtt gag ctt gac cag gcc gaa
1920

Asn Leu Pro Ser His Pro Val Asp Pro Val Glu Leu Asp Gln Ala Glu

625

630

635

640

agc ttc aac gct gcc cag aac cag acc cct cag att caa tca agt ctc
1968

Ser Phe Asn Ala Ala Gln Asn Gln Thr Pro Gln Ile Gln Ser Ser Leu

645

650

655

caa gct cct cag acc aga gtg ttc act cct acc acc acc gac agt gac
2016

Gln Ala Pro Gln Thr Arg Val Phe Thr Pro Thr Thr Thr Asp Ser Asp

660

665

670

agt gat gcc tca tta gtc tta att aaa gca tct cta aag gtc act aag
2064

Ser Asp Ala Ser Leu Val Leu Ile Lys Ala Ser Leu Lys Val Thr Lys

675

680

685

cga gca gaa gga aag aca gcc act agt gaa ctt ccc gtg tct cgc aca
2112

Arg Ala Glu Gly Lys Thr Ala Thr Ser Glu Leu Pro Val Ser Arg Thr

690

695

700

caa atc gaa ctg gac aat ttg ctg aag cag aac aca atc agc gag ttg
2160

Gln Ile Glu Leu Asp Asn Leu Leu Lys Gln Asn Thr Ile Ser Glu Leu

705

710

715

720

aac gat gag gat gtc gtt gcc ttg tct ttg cgg gga aag gtt ccc ggg
2208

Asn Asp Glu Asp Val Val Ala Leu Ser Leu Arg Gly Lys Val Pro Gly

725

730

735

tat gcc cta gag aag agt ctc aaa gac tgc act cgt gcc gtc aag gtt
2256

Tyr Ala Leu Glu Lys Ser Leu Lys Asp Cys Thr Arg Ala Val Lys Val

740

745

750

cgc cgc tct atc att tcg agg aca ccg gct acc gca gag ctt aca agt
2304

Arg Arg Ser Ile Ile Ser Arg Thr Pro Ala Thr Ala Glu Leu Thr Ser

755

760

765

atg ctg gag cac tcg aag ctg ccg tac gaa aac tac gcc tgg gaa cgc
2352

Met Leu Glu His Ser Lys Leu Pro Tyr Glu Asn Tyr Ala Trp Glu Arg

770

775

780

gtg ctc ggt gca tgt tgc gag aac gtt att ggc tat atg cca gtc cct
2400

Val Leu Gly Ala Cys Cys Glu Asn Val Ile Gly Tyr Met Pro Val Pro

785

790

795

800

gtt ggc gtc gcc ggt cct att gtt atc gac ggc aag agt tat ttc att
2448

Val Gly Val Ala Gly Pro Ile Val Ile Asp Gly Lys Ser Tyr Phe Ile

805

810

815

cct atg gca acc acc gag ggc gtc ctc gtc gct agt gct agc cgt ggc

2496
 Pro Met Ala Thr Thr Glu Gly Val Leu Val Ala Ser Ala Ser Arg Gly
 820 825 830

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 2544
 Ser Lys Ala Ile Asn Leu Gly Gly Gly Ala Val Thr Val Leu Thr Gly
 835 840 845

 gac ggt atg aca cga ggc ccg tgt gtg aag ttt gat gtc ctt gaa cga
 2592
 Asp Gly Met Thr Arg Gly Pro Cys Val Lys Phe Asp Val Leu Glu Arg
 850 855 860

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 2640
 Ala Gly Ala Ala Lys Ile Trp Leu Asp Ser Asp Val Gly Gln Thr Val
 865 870 875 880

 atg aaa gaa gcc ttc aat tca acc agc aga ttt gcg cgc tta caa agt
 2688
 Met Lys Glu Ala Phe Asn Ser Thr Ser Arg Phe Ala Arg Leu Gln Ser
 885 890 895

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 2736
 Met Arg Thr Thr Ile Ala Gly Thr His Leu Tyr Ile Arg Phe Lys Thr
 900 905 910

 act act ggc gac gct atg gga atg aat atg att tct aag ggc gtg gag
 2784
 Thr Thr Gly Asp Ala Met Gly Met Asn Met Ile Ser Lys Gly Val Glu
 915 920 925

 cat gca ctg aat gtt atg gcg aca gag gca ggt ttc agc gat atg aat
 2832

His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn
 930 935 940

att att acc cta tca gga aat tac tgt acg gat aag aaa cct tca gct
 2880
 Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala
 945 950 955 960

ttg aat tgg atc gat gga cgg ggc aag ggc att gtg gcc gaa gcc atc
 2928
 Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile
 965 970 975

ata ccg gcg aac gtt gtc agg gat gtc tta aag agc gat gtg gat agc
 2976
 Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser
 980 985 990

atg gtt cag ctc aac ata tcg aaa aat ctg att ggg tcc gct atg gct
 3024
 Met Val Gln Leu Asn Ile Ser Lys Asn Leu Ile Gly Ser Ala Met Ala
 995 1000 1005

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 3069
 Gly Ser Val Gly Gly Phe Asn Ala Gln Ala Ala Asn Leu Ala Ala
 1010 1015 1020

gcc att ttc att gcc aca ggt cag gat ccg gcg caa gtt gtg gag
 3114
 Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala Gln Val Val Glu
 1025 1030 1035

agc gct aac tgc atc act ctc atg aac aat ctt cgc gga tcg ctt
 3159
 Ser Ala Asn Cys Ile Thr Leu Met Asn Asn Leu Arg Gly Ser Leu

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caa atc tct gtc tcc atg ccg	tct att gag gtt gga	acg ttg ggc
3204		
Gln Ile Ser Val Ser Met Pro	Ser Ile Glu Val Gly	Thr Leu Gly
1055	1060	1065
ggg ggt acg att ctg gag ccc	cag ggc gca atg ctt	gac atg ctt
3249		
Gly Gly Thr Ile Leu Glu Pro	Gln Gly Ala Met Leu	Asp Met Leu
1070	1075	1080
ggg gtc cgc gga tca cac ccg	acc act ccc ggt gag	aat gca cgt
3294		
Gly Val Arg Gly Ser His Pro	Thr Thr Pro Gly Glu	Asn Ala Arg
1085	1090	1095
caa ctt gcg cgc atc atc gga	agc gct gtt ttg gct	ggg gag ctc
3339		
Gln Leu Ala Arg Ile Ile Gly	Ser Ala Val Leu Ala	Gly Glu Leu
1100	1105	1110
tcg cta tgt gct gcc cta gcc	gcc ggt cac ctg gtc	aag gcg cac
3384		
Ser Leu Cys Ala Ala Leu Ala	Ala Gly His Leu Val	Lys Ala His
1115	1120	1125
atg gcg cac aac cgt tct gcc	ccg gca tct tca gcc	cct tct cga
3429		
Met Ala His Asn Arg Ser Ala	Pro Ala Ser Ser Ala	Pro Ser Arg
1130	1135	1140
agt gtc tcc ccg tca ggc gga	acc agg aca gtc cct	gtt cct aac
3474		
Ser Val Ser Pro Ser Gly Gly	Thr Arg Thr Val Pro	Val Pro Asn

1145	1150	1155
aat gca ctg agg ccg agt gct gca gct act gat cgg gct cga cgc		
3519		
Asn Ala Leu Arg Pro Ser Ala Ala Ala Thr Asp Arg Ala Arg Arg		

1160	1165	1170
------	------	------

tga
3522

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<211> 1173

<212> PRT

<213> Penicillium citrinum

<400> 50

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Asn	Gln	Gln	His	Pro	Leu	Arg	Ser	Gly	Asn	Arg	Ala	Leu	Thr	Ser	Thr
			20					25					30		

Leu	Gln	Phe	Leu	Ser	Lys	Thr	Ala	Cys	Leu	His	Pro	Ile	His	Thr	Val
		35					40					45			

Cys	Thr	Ile	Ala	Ile	Leu	Ala	Ser	Thr	Thr	Tyr	Val	Gly	Leu	Leu	Lys
	50					55					60				

Asp	Ser	Phe	Phe	His	Gly	Pro	Ala	Asn	Val	Asp	Lys	Ala	Glu	Trp	Gly
65					70					75					80

Ser	Leu	Val	Glu	Gly	Ser	Arg	Ser	Leu	Ile	Thr	Gly	Pro	Gln	Asn	Gly
				85					90					95	

Trp	Lys	Trp	Gln	Ser	Phe	Asp	Gly	Asp	Ala	Asp	Val	Leu	Gly	Asp	Phe	100	105	110
Asn	His	Gln	Ala	Leu	Met	Thr	Leu	Val	Phe	Pro	Gly	Ser	Tyr	Gly	Val	115	120	125
Ala	Ser	Gln	Ala	Ala	Ser	Pro	Phe	Leu	Ala	Pro	Leu	Pro	Val	Asn	Leu	130	135	140
Ser	Val	Ile	Asp	Leu	Pro	Ser	Thr	Ser	Ser	Pro	Leu	Thr	Ala	Tyr	Ser	145	150	155
Lys	Asp	Lys	Val	Phe	Ala	Phe	Ser	Val	Glu	Tyr	Ser	Ser	Ala	Pro	Glu	165	170	175
Leu	Val	Ala	Ala	Val	Gln	Glu	Ile	Pro	Asn	Asn	Ser	Ala	Asp	Leu	Lys	180	185	190
Leu	Gln	Glu	Thr	Gln	Leu	Ile	Glu	Met	Glu	Arg	Gln	Met	Trp	Ile	Met	195	200	205
Lys	Ala	Ala	Arg	Ala	His	Thr	Lys	Arg	Ser	Leu	Ala	Gln	Trp	Val	His	210	215	220
Asp	Thr	Trp	Thr	Glu	Ser	Leu	Asp	Leu	Ile	Lys	Ser	Ala	Gln	Thr	Leu	225	230	235
Asp	Val	Val	Val	Met	Val	Leu	Gly	Tyr	Ile	Ser	Met	His	Leu	Thr	Phe	245	250	255
Val	Ser	Leu	Phe	Leu	Ser	Met	Lys	Lys	Leu	Gly	Ser	Lys	Val	Trp	Leu	260	265	270
Ala	Thr	Ser	Val	Leu	Leu	Ser	Ser	Thr	Phe	Ala	Phe	Leu	Leu	Gly	Leu	275	280	285
Asp	Val	Ala	Ile	Arg	Leu	Gly	Val	Pro	Met	Ser	Met	Arg	Leu	Leu	Ser	290	295	300

Glu 305	Gly	Leu	Pro	Phe	Leu 310	Val	Val	Ile	Val	Gly 315	Phe	Glu	Lys	Ser	Ile 320
Thr	Leu	Thr	Arg	Ala 325	Val	Leu	Ser	Tyr	Ala 330	Val	Gln	His	Arg	Lys 335	Pro
Gln	Lys	Ile	Gln 340	Ser	Asp	Gln	Gly	Ser 345	Val	Thr	Ala	Ile	Ala 350	Glu	Ser
Thr	Ile	Asn 355	Tyr	Ala	Val	Arg	Ser 360	Ala	Ile	Arg	Glu	Lys 365	Gly	Tyr	Asn
Ile	Val 370	Cys	His	Tyr	Val	Val 375	Glu	Ile	Leu	Leu	Leu 380	Val	Ile	Gly	Ala
Val 385	Leu	Gly	Ile	Gln	Gly 390	Gly	Leu	Gln	His	Phe 395	Cys	Val	Leu	Ala	Ala 400
Leu	Ile	Leu	Phe	Phe 405	Asp	Cys	Leu	Leu	Leu 410	Phe	Thr	Phe	Tyr	Thr 415	Ala
Ile	Leu	Ser	Ile 420	Lys	Leu	Glu	Val	Asn 425	Arg	Leu	Lys	Arg	His 430	Ile	Asn
Met	Arg	Tyr 435	Ala	Leu	Glu	Asp	Glu 440	Gly	Leu	Ser	Gln	Arg 445	Thr	Ala	Glu
Ser	Val 450	Ala	Thr	Ser	Asn	Asp 455	Ala	Gln	Asp	Ser	Ala 460	Arg	Thr	Tyr	Leu
Phe 465	Gly	Asn	Asp	Met	Lys 470	Gly	Ser	Ser	Val	Pro 475	Lys	Phe	Lys	Phe	Trp 480
Met	Val	Val	Gly	Phe 485	Leu	Ile	Val	Asn	Leu 490	Val	Asn	Ile	Gly	Ser	Thr 495
Leu	Phe	Gln	Ala	Ser	Ser	Ser	Gly	Ser	Leu	Ser	Ser	Ile	Ser	Ser	Trp

500							505					510				
Thr	Glu	Ser	Leu	Ser	Gly	Ser	Ala	Ile	Lys	Pro	Pro	Leu	Glu	Pro	Phe	
		515					520					525				
Lys	Val	Ala	Gly	Ser	Gly	Leu	Asp	Glu	Leu	Leu	Phe	Gln	Ala	Arg	Gly	
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Arg	Gly	Gln	Ser	Thr	Met	Val	Thr	Val	Leu	Ala	Pro	Ile	Lys	Tyr	Glu	
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Leu	Glu	Tyr	Pro	Ser	Ile	His	Arg	Gly	Thr	Ser	Gln	Leu	His	Glu	Tyr	
				565					570					575		
Gly	Val	Gly	Gly	Lys	Met	Val	Gly	Ser	Leu	Leu	Thr	Ser	Leu	Glu	Asp	
			580					585					590			
Pro	Val	Leu	Ser	Lys	Trp	Val	Phe	Val	Ala	Leu	Ala	Leu	Ser	Val	Ala	
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Leu	Asn	Ser	Tyr	Leu	Phe	Lys	Ala	Ala	Arg	Leu	Gly	Ile	Lys	Asp	Pro	
	610					615					620					
Asn	Leu	Pro	Ser	His	Pro	Val	Asp	Pro	Val	Glu	Leu	Asp	Gln	Ala	Glu	
625					630					635					640	
Ser	Phe	Asn	Ala	Ala	Gln	Asn	Gln	Thr	Pro	Gln	Ile	Gln	Ser	Ser	Leu	
				645					650					655		
Gln	Ala	Pro	Gln	Thr	Arg	Val	Phe	Thr	Pro	Thr	Thr	Thr	Asp	Ser	Asp	
			660					665					670			
Ser	Asp	Ala	Ser	Leu	Val	Leu	Ile	Lys	Ala	Ser	Leu	Lys	Val	Thr	Lys	
		675					680					685				
Arg	Ala	Glu	Gly	Lys	Thr	Ala	Thr	Ser	Glu	Leu	Pro	Val	Ser	Arg	Thr	
	690					695					700					

Gln	Ile	Glu	Leu	Asp	Asn	Leu	Leu	Lys	Gln	Asn	Thr	Ile	Ser	Glu	Leu	705	710	715	720
Asn	Asp	Glu	Asp	Val	Val	Ala	Leu	Ser	Leu	Arg	Gly	Lys	Val	Pro	Gly		725	730	735
Tyr	Ala	Leu	Glu	Lys	Ser	Leu	Lys	Asp	Cys	Thr	Arg	Ala	Val	Lys	Val	740		745	750
Arg	Arg	Ser	Ile	Ile	Ser	Arg	Thr	Pro	Ala	Thr	Ala	Glu	Leu	Thr	Ser	755	760		765
Met	Leu	Glu	His	Ser	Lys	Leu	Pro	Tyr	Glu	Asn	Tyr	Ala	Trp	Glu	Arg	770	775		780
Val	Leu	Gly	Ala	Cys	Cys	Glu	Asn	Val	Ile	Gly	Tyr	Met	Pro	Val	Pro	785	790	795	800
Val	Gly	Val	Ala	Gly	Pro	Ile	Val	Ile	Asp	Gly	Lys	Ser	Tyr	Phe	Ile		805	810	815
Pro	Met	Ala	Thr	Thr	Glu	Gly	Val	Leu	Val	Ala	Ser	Ala	Ser	Arg	Gly		820	825	830
Ser	Lys	Ala	Ile	Asn	Leu	Gly	Gly	Gly	Ala	Val	Thr	Val	Leu	Thr	Gly	835	840		845
Asp	Gly	Met	Thr	Arg	Gly	Pro	Cys	Val	Lys	Phe	Asp	Val	Leu	Glu	Arg	850	855	860	
Ala	Gly	Ala	Ala	Lys	Ile	Trp	Leu	Asp	Ser	Asp	Val	Gly	Gln	Thr	Val	865	870	875	880
Met	Lys	Glu	Ala	Phe	Asn	Ser	Thr	Ser	Arg	Phe	Ala	Arg	Leu	Gln	Ser		885	890	895
Met	Arg	Thr	Thr	Ile	Ala	Gly	Thr	His	Leu	Tyr	Ile	Arg	Phe	Lys	Thr		900	905	910

Thr Thr Gly Asp Ala Met Gly Met Asn Met Ile Ser Lys Gly Val Glu
915 920 925

His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn
930 935 940

Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala
945 950 955 960

Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile
965 970 975

Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser
980 985 990

Met Val Gln Leu Asn Ile Ser Lys Asn Leu Ile Gly Ser Ala Met Ala
995 1000 1005

Gly Ser Val Gly Gly Phe Asn Ala Gln Ala Ala Asn Leu Ala Ala
1010 1015 1020

Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala Gln Val Val Glu
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Ser Ala Asn Cys Ile Thr Leu Met Asn Asn Leu Arg Gly Ser Leu
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Gln Ile Ser Val Ser Met Pro Ser Ile Glu Val Gly Thr Leu Gly
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Gly Gly Thr Ile Leu Glu Pro Gln Gly Ala Met Leu Asp Met Leu
1070 1075 1080

Gly Val Arg Gly Ser His Pro Thr Thr Pro Gly Glu Asn Ala Arg
1085 1090 1095

Gln Leu Ala Arg Ile Ile Gly Ser Ala Val Leu Ala Gly Glu Leu

1100	1105	1110
Ser Leu Cys Ala Ala Leu 1115	Ala Ala Gly His Leu 1120	Val Lys Ala His 1125
Met Ala His Asn Arg Ser 1130	Ala Pro Ala Ser Ser 1135	Ala Pro Ser Arg 1140
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